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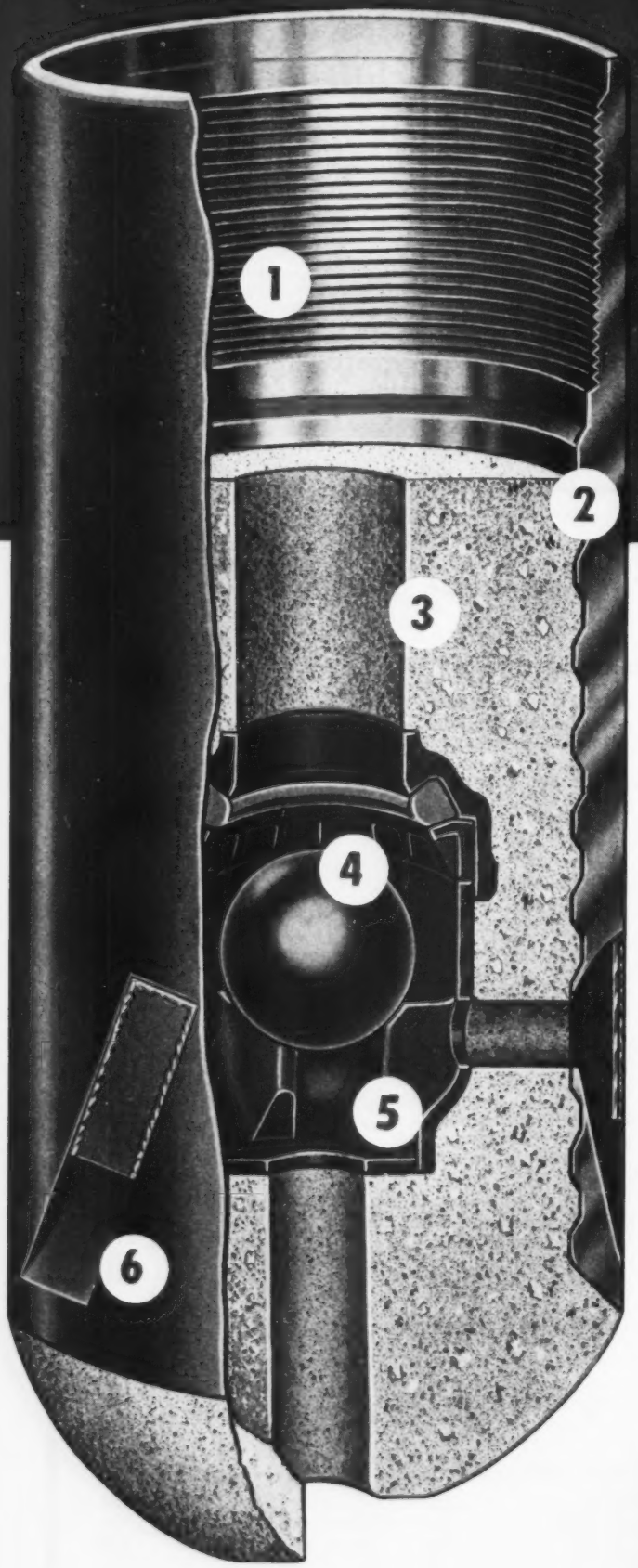

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Social and Economic Values

A NEW note in oil-industry assemblies was sounded last week at the annual meeting of the National Petroleum Association through a panel discussion of conditions arising from the abundance of petroleum products in this country.

Oil men are accustomed to discuss their activities in terms of techniques, government regulations, taxes, wages, employe relations, dividends, and all the other factors that have a bearing on day-to-day operations. But in the final analysis an industry, as in the case of individuals, is judged by social and economic values largely determined by those outside the business itself.

As was clearly revealed at Atlantic City the oil industry has nothing to fear from studies having to do with its many contributions to the betterment of society. N.P.A. speakers pointed out that economic advancement closely parallels the use of petroleum products. This nation's economy started to pass that of every other country at the beginning of the century when the motor vehicle emerged from the experimental and luxury stages. Now power, heat, and light, supplied by petroleum and natural gas, touch every family in the making of a living and in its leisure around which social progress evolves.

Petroleum consumption is as good a comparison as any that can be made indicating the difference between our economy and that of other peoples. No other country has half the per capita petroleum consumption that we do, and throughout most of the world it is in the order of 5 to 20 per cent as much. Historically this country started to forge ahead of Western Europe in living standards when the petroleum and automotive industries, and the now numerous and important allied enterprises, revolutionized transportation and brought cheap and convenient power to all the basic activities of man.

It is well that the petroleum industry advise itself regarding these matters. That having been done the next move will be to inform others. We have a generation and others to follow who know nothing about the horse-and-buggy days and the living standards that were part of that period. They don't realize that most of the peoples of the world are still living within our nineteenth-century standards or less.

The family car, farm tractor, truck transportation, oil heat, and the thousands of necessities and luxuries of today's living are taken for granted by those who have never been without them. There is little knowledge of how they came about and also no realization that they can be lost much quicker and easier than they were secured. This industry could serve the nation in these confusing times in no better way than to spearhead a program which would result in an appreciation of our economic and social accomplishments and what has to be done to maintain them.

Profit-Limitation Prospect Hampers Plans of Long-Haul Gas Lines

by Henry D. Ralph

WASHINGTON.—The prospect that all producers of natural gas who sell for movement through an interstate pipe line may have their profits limited by the Federal Power Commission, as indicated by a recent court decision, is already having an adverse effect on the plans of various long-distance transmission companies.

The case was that of the Interstate Natural Gas Co., Inc., decided August 3 by the U. S. Circuit Court of Appeals for the Fifth Circuit in which the court, by a two-to-one decision, upheld an order of the Federal Power Commission fixing the price at which the company sold gas in the Monroe, Louisiana, field to three transmission companies for transportation to other states.

In a decision which apparently can be applied to all natural-gas producers the court held that the sales price fixed by the commission was not confiscatory because it returned the company 6.5 per cent on the rate base fixed by FPC.

One repercussion of this decision arose last week during FPC hearings on the application of the Michigan-Wisconsin Pipe Line Co. for permission to construct a new transmission line from the Oklahoma Panhandle to the Middle West. The company has options to purchase gas from Phillips Petroleum Co., much of which will be purchased by Phillips from other producers in Oklahoma and Texas. These options expire December 1. The company has asked the FPC to make a decision before December 1—which the trial examiner says is impossible—because of the likelihood that the options will not be renewed as a result of the Interstate decision.

Attorneys told FPC that under the Circuit Court decision there is little doubt that Phillips would be considered a "natural-gas company," subject to FPC regulation, if it goes through with its contract to sell gas to Michigan-Wisconsin for interstate transmission. Furthermore, Phillips' gathering system is so located that the field gas it proposes to buy from others would be moved across the Texas-Oklahoma state line before being delivered to the Michigan-Wisconsin company and this might make the original producers subject to FPC by reason of their sales to Phillips.

There is one possible loophole in the Interstate decision which might prevent its application to all gas producers. This is the incidental fact that Interstate was already subject to FPC regulation because it owned a transmission line crossing state lines. However, the gas involved in this case had nothing to do with the company's pipe-line operations, but was gas produced by it and sold to other pipe line companies in the Monroe field. FPC held that the sales were in interstate commerce and ordered the sales price reduced to a point which would limit Interstate's return to 6.5 per cent.

The court took no notice of this dual status of the Interstate company, and its decision appears to make every gas producer subject to rate regulation by FPC as to all sales to pipe lines.

The Independent Natural Gas Association of America, intervening as amicus curiae, is now petitioning the Fifth Circuit Court for a rehearing and reversal of the Interstate case, and its brief cites many legal reasons why the original decision was in error.

"It is common knowledge," I.N.G.A. told the court, "that virtually every field sale of natural gas by a producer is made to a pipe-line company, known by the vendor to be engaged in the transportation of natural gas in interstate commerce and the sale in interstate commerce of natural gas for resale.

"The 'end result,' therefore, of the commission order and the opinion and judgment of this court is to subject every producer and vendor of natural gas, who sells the same locally in the field of production to an interstate pipe-line company, to the rate-regulatory jurisdiction of the commission. This conclusion beyond question is aside from and beyond the clear Congressional intent and the specific affirmative and negative jurisdictional provisions of the act."

FPC Counsel Declines Answer

It is significant that during the argument of the Interstate case one of the judges asked the FPC counsel if the commission's position would not mean that it had jurisdiction over every well-head sale of gas destined for interstate movement, but the FPC man flatly refused to give an answer.

Federal Power Commissioners are prone to say in public speeches that they have no desire to regulate natural-gas production or gathering but it appears that they now have such power, or at least that many gas producers are so afraid that FPC has this power that they are hesitant to enter sales contracts with interstate transmission lines for fear the commission will cut their prices down to a 6.5 per cent return.

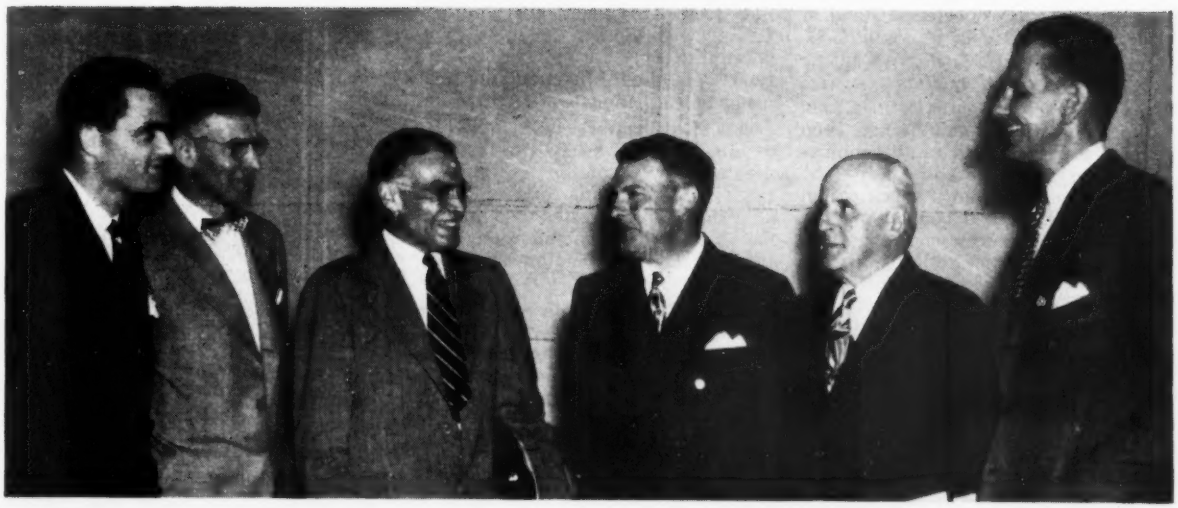
In regard to the request of Michigan-Wisconsin Pipe Line Co. for a decision on its application before December 1, Nelson Lee Smith, FPC member, last week, said the commission had given "careful consideration" to the requests made by Michigan-Wisconsin counsel.

In a statement made on behalf of the commission, Smith said "the commission has been made fully aware . . of the importance to the applicant, Michigan-Wisconsin Pipe Line Co., of certain expiration dates contained in its gas-supply contract. It does not believe that it should permit the seriousness of the situation of one of the parties to serve the purposes of other parties to the possible disadvantage of the public . . .

"In these circumstances and in view of the importance of the issues presented it would not be proper that this proceeding should be conducted in the atmosphere of pressure and haste implied by Mr. Shannon's (counsel for Michigan-Wisconsin) suggestion, which therefore, cannot be adopted . . ." Smith, however, said the commission was instructing the examiner to expedite the hearing in every proper way.

GAS-ACT AMENDMENT

A series of amendments to the natural-gas act sharply curtailing the power of the Federal Power Commission has been recommended by counsel for the Natural-Gas Industry Committee which presented the industry's case in the recent FPC natural-gas investigation. The amendments proposed by Wesley E. Disney, general counsel for the committee and Don C. Culton, Amarillo, Tex., would legally prohibit FPC from any rate-regulation authority over production and gathering of gas. Besides clarifying the language of the act, the amendments also would forbid any restriction on end use, exclude from consideration in rate cases "a calculated value based on a natural-gas company's investment in producing properties and facilities," and define sales in interstate commerce as sales made after the interstate transportation is completed.



Talking with Atlantic Refining Co.'s Economics Director Dr. John D. Gill, third from left, are five NPA officers. From left to right, they are: Donald C. O'Hara, attorney; Earle M. Craig, second vice president; Gill; J. B. Fisher, president; Fayette B. Dow, general counsel; and Joseph E. Keller, attorney

Labor, Lead Shortage Highlight N.P.A. Convention Discussions

by Warren W. Burns

ATLANTIC CITY. — Compulsory arbitration of labor disputes to convince labor leaders of their responsibility to union members and the public, was advocated here by Walter Chamblin, Jr., vice president of National Association of Manufacturers during the September 18-20 meeting of the fourty-fourth annual convention of the National Petroleum Association, a meeting which was largely devoted to discussing means to solve recurring labor disputes.

Other topics which were considered at length included refining, lubricating-oil taxation, sulfur content of gasoline in various states, the outlook for tetraethyl lead, and specification vs. brand buying of lube and turbine oils. The convention ended with an historical challenge from Atlantic Refining Co.'s John D. Gill for anyone —and everyone present knew he meant the U. S. Department of Justice —to dispute the fact the petroleum industry has probably been more instrumental than any other single industry in contributing to the expanding economy of this nation.

In reference to the Government's antitrust allegations in the "Mother Hubbard" antitrust suit against the American Petroleum Institute, major oil companies, and others, Gill, Atlantic Refining's director of economics and a member of the board of directors, said:

"Really questionable or downright illegal conduct should have resulted in material financial advantage to the offenders. Profits are criteria. Indeed, during recent years one agency of the Government has judged the propriety of the industry's prices by the industry's profits. Perhaps similar reasoning should be applied to the nature, intent, and effect of conduct. As a matter of fact, the industry's profits, expressed as a rate of return on investment, have lagged behind the profits of many other industries."

In stating that "there is no imminence of depletion of our petroleum resources," Gill pointed out that U. S. geologists estimate that this country has 950,000,000 acres of lands geologically favorable to the existence of oil. Less than 200,000,000 of these acres are currently under lease for the purpose of prospecting, and the entire current production of crude oil, nearly 5,000,000 bbl. daily, comes from reserves covered by only a little more than 5,000,000 surface acres.

If more metallic lead is not available for manufacture into tetraethyl lead—and there is no assurance of it—"the shortage of tetraethyl lead will have grave consequences in the oil industry and serious repercussions in the nation's automotive transportation," according to a customer report released by Ethyl at the N.P.A. meeting.

Since last April, OPA has allocated 4,000 tons monthly to the Ethyl Corp. against a normal demand of 6,000 tons. But it has been virtually impossible for Ethyl to secure even the supplies permitted under its CPA allocations. During May, June, and July, the corporation was able to purchase only small fractions of the quantities allocated and maintained manufacturing schedules only by using metallic-lead inventories. During August, when the CPA allocation again was 4,000 tons, it was possible to secure only 1,750 tons. "The result has been that the corporation has nearly exhausted its inventories of metallic lead, in order to manufacture even the reduced quantities of tetraethyl lead permitted by the CPA," the Ethyl release explained, adding: "It appears, on the basis of present estimates, that the corporation's inventories of metallic lead will be down to 2,800 tons by October 1, while inventories of finished tetraethyl lead will be correspondingly low."

Moreover, it was pointed out that "approximately 2,000 tons of metallic lead are in sight for October and, probably, an equal amount for each month thereafter. It is obvious that the corporation must obtain additional lead supplies in the immediate future if it is to manufacture sufficient product to meet the approximately 4,000-ton a month schedule that is required to fill oil-company orders under CPA Order L-355."

Lead-industry spokesmen foresee only 750,000 tons of lead for 1946, consisting of 350,000 tons from primary production; 300,000 tons from secondary lead; and imports of 100,000 tons.

Against this is a projected demand of 1,000,000 tons or more annually.

In reporting activities of the lubrication committee, L. C. Welch, Standard Oil Co. (Ind.), and D. P. Clark, Gulf Oil Corp., said that it had been decided to recommend to all committee members that "brand buying" be adopted rather than "specification buying." And in this connection, Dr. J. C. Geniesse, process supervisor for heavy oils, Atlantic Refining, in his "Progress Report on Lubrication Projects in A.S.T.M.," said:

"Within the last year committees have been set up to devise recommended practices for aid in the purchase of lubricants. Undoubtedly this will cause considerable discussion in industry leading to the optimism among purchasing groups that now we will have competitive bidding and to consternation among marketers fearing that industry was being regimented.

"It is a well-known fact everyone wants specifications on the other man's products, but not on his since he wishes to reserve the right to exercise his showmanship. He should retain that right since it inevitably leads to prodigious efforts to make his product better than those of his competitors. Without this goal all true advances cease and we would become members of a decadent industry.

"On the other hand, there is a need for procurement practices that will serve two purposes; namely, (1) the ruling out of products that are unsatisfactory in service, and (2) the elimination of specifications which stifle initiative.

"Regarding the first, it is a well-known fact that a few marketers are taking advantage of the fact that lubrication is a very complex subject by selling products which are definitely unsuited for the purpose. Consumers should have some guidance in order to avoid expensive shutdowns and maintenance schedules.

"Regarding the second factor, many industrial concerns and governmental bodies are setting up specifications which are restrictive in character and which rule out products perfectly satisfactory and are dampening initiative in the development of superior products. It is believed that cooperative efforts and study of this subject will retard the development of restrictive specifications and yet help solve the problems facing the consumer."

In favoring the brand names over specification, it was pointed out that there is no reliable criteria for laboratory use to determine exactly what lubricating and turbine-oil specifications should be.

Another lubricating-oil subject which concerned N.P.A. members was nomenclature. A decision was made to recommend (and passage is believed certain) that the following terms be adopted: "regular type," "premium type," and "heavy duty type." The main objection was to the using of the single word "premium."

N.A.M.'s Chamblin later told N.P.A. members that in a new tax bill being drafted in Washington the "nuisance tax" on lubricating oils might be abolished. He suggested that industry members favoring the abolition of this tax contact their senators and representatives.

E. L. Cleavland, Socony-Vacuum Oil Co., Inc., and chairman of the "New Times and Old Problems" panel added that there has been much discussion with the Internal Revenue Bureau concerning pipe-line taxes, "particularly in view of the fact that every time internal revenue agents make an audit they find something new to slap a tax on."

Sulfur Content in Gasoline

Concerning the sulfur content which various states allow in gasoline, John Day, secretary of Western Petroleum Refiners Association, advocated a maximum of 0.25 per cent latitude. To date, there has been no scientific data to show that sulfur is harmful to automotive engines, Day pointed out, adding that in tractor fuels there is 0.5 per cent of sulfur.

Any move to eliminate private-carrier operation in the petroleum industry will be strongly resisted by oil companies, Fred Hufnagel, assistant coordinator of Sun Oil Co., told a traffic and transportation session at the N.P.A. meeting.

He said the private carrier alone can maintain the flexibility required in today's operations and can best adjust itself to meet changing cost factors with rates based on actual expenses and not on "bureaucratic whimsey." The oil industry, he said, has learned from bitter exxperience that its existence depends on "reliable and cheap transportation."

The dependence of this nation's economy on petroleum was emphasized by Arthur C. Butler, director of the National Highway Users Conference, who said that World War 2 has made us realize our growing dependence on highway transportation as never before.

Stanley N. Shaw, Washington economist and publisher, held that "today we are on dangerous grounds once more," and "within a few months American business must start on one of its painful periods of readjustment. We had the chance when the war ended of avoiding another boom-bust, but we have missed our chance. For 13 months we have been hoping that a normal business recovery could get under way, but business has been stymied on every hand. When the Government relaxed the tight rein it held during wartime, it began making decisions affecting business on political rather than economic grounds."

Donald R. Richberg, Washington attorney and former NRA official, said that "the main trend in industrial relations is toward the destruction of a free economy by labor monopolies." And at the same time, he explained that "democratic processes of government are being destroyed by labor dictators." While upholding the right to strike as a last resort, Richberg said that the strike was now being used to uphold any "selfish interests of a labor union or the ambitions of its leadership."

In a round-table discussion, "Collective Bargaining Contracts in the Petroleum Industry," B. L. Stilphen, industrial-relations director, Sinclair Refining Co., brought out the point that while bargaining on a national basis has its difficulties—and Sinclair is the only oil company with a national contract—that "it is practical and inexpensive." However, Stilphen carefully emphasized that Sinclair does not favor industry wide bargaining.

Dr. Elmer L. Kayser, dean of George Washington University, stated that "a dynamic position in foreign affairs will be taken by the Soviet Union in a well-conceived design to realize certain objectives"—both political and economical.

J. B. Fisher, president of Kendall Refining Co., was elected to the presidency of N.P.A., succeeding H. A. Logan, president of United Refining Co. W. S. Zehrung, president of Pennzoil Co., was named first vice president and Earle M. Craig, president of Freedom-Valvoline Oil Co., was elected second vice president. Fayette B. Dow, general counsel, Harry S. Elkins, traffic attorney, Horace L. Lohnes, Joseph E. Keller, and Donald C. O'Hara, attorneys, were reelected. Herbert G. Easton, recording secretary for the entire 44 years of N.P.A. existence, continues in that position. G. B. Hunter is treasurer.

Among the resolutions adopted by the association were those calling for:

1. All possible efforts by Government agencies to meet the critical shortage of lead. The association's September 21 bulletin said it has become "crystal clear" in Washington that the critical lead shortage is the most serious materials problem facing the petroleum industry.

2. Repeal of the lubricating-oil tax imposed by the federal Government.

3. Amendment of the National Labor Relations Act to deprive workers who strike in violation of contracts of their status as "employes" under the act.

4. Amendments to both the Wagner Act and the Norris-LaGuardia Act to protect both employers and employes against secondary boycotts and picketing where there is no dispute in the plant.

THIS 1946 SMTWTFS WEEK

INTERNATIONAL— R. G. Follis, California Standard president, indicates in press conference in New York that company has no intentions of importing any substantial quantities of Middle East crude in immediate future. . . . Says Eastern Hemisphere is logical marketing place for Middle East material. . . . Discloses company is definitely planning refinery near Alexandria, Egypt. . . . ¶Heavy gas flow reported from third Chilean test in Tierro del Fuego. . . . ¶Agreement reached between oil-company officials and representatives of South Sumatra Republican Government to allow resumption of work by some 3,600 Indonesians at Palembang under European supervision. . . .

NATURAL GAS— H. C. Price Co. gets $3,750,000 contract for construction of the California section of the Texas-Los Angeles gas line. . . . Laying of the 30-in. high-pressure pipe due to begin in January. . . . ¶FPC turns down pleas of Michigan-Wisconsin Pipe Line Co. for a decision on its proposed gas transmission line before expiration of gas-supply contracts December 1. . . . Producing companies seen as reluctant to enter into gas contracts as a result of recent court decision indicating producers selling gas for movement in interstate commerce may be subject to FPC jurisdiction. . . .

GOVERNMENT—National Petroleum Council members gather in Washington this week for second meeting. . . . An antitrust-immunity angle cleared somewhat by recent additional letters on the subject from the Department of Justice. . . . Council may take up protests of New England jobbers and other independents against lack of representation on the council, also recently expressed views of several State Department officials on international oil control. . . . Adm. Ernest J. King, former chief of Naval operations, due to explain his part in promoting the Canol project to the Mead investigating committee this week. . . .

TRANSPORTATION— Developments in the Government's efforts to dispose of the big-inch lines hold attention. . . . WAA announces advisory group representing other U. S. agencies will pass on bid recommendations of WAA real-property board. . . . WAA calls Army, Navy, Interior, and Commerce representatives' conference to discuss proposal to relay one of the lines from the Permian Basin to the West Coast as a crude carrier. . . . ¶New York sources say world's largest tanker now under construction at Norfolk, Va., will be used in Middle East trade. . . . Vessel will carry 215,000 bbl. of gasoline, is 581 ft. in length. . . . ¶Phillips buys site near Denver as terminal products line from Texas. . . . Socony-Vacuum completes products terminal with capacity of more than 16,500,000 gal. at Newington, N. H.

REFINING—No change made in lead allocation for tetraethyl lead production for fourth quarter, but situation worsening in that Ethyl Corp. is unable to buy amounts allocated. . . . National Petroleum Association says lead shortage is most serious materials problem facing the petroleum industry. . . . ¶N.P.A. at Atlantic City meeting passes resolution asking repeal of U. S. lubricating-oil tax.

EXPLORATION— Reese H. Taylor, president of Union Oil Co. of California, tells newsmen in Seattle that company is prepared to spend millions of dollars if necessary to search for oil in Washington State. . . . Union now holds leases on about 170,000 acres, half state lands. . . .

The oil industry is constantly striving to adapt its operations to serve the rapidly-growing postwar aviation industry. One manifestation of this effort was the installation of a new aircraft-fueling system at Moisant International Airport in New Orleans. Here engineers of the Louisiana Division of Standard Oil Co. of New Jersey and the airport devised a method which is attracting the attention of airport engineers elsewhere in the country as well as of the Army. Aviation gasoline is pumped through underground piping to 14 valve boxes on the airport apron. The airplane—a Pan American World Airways Clipper is shown in the picture—taxies close to one of these locations, and a light truck is driven between the valve box and the plane. A hose from one side of the truck connects to the valve box coupling and extends through meters and filter to the plane's tanks. Remote pumps are started from controls in the valve box, and the flow of gasoline is controlled by opening or closing the hose nozzle. The plan eliminates unwieldy tank trucks, avoids exposed meters, allows the truck motor to be stopped during refueling, and gives fueling service without the necessity of refilling a tank truck

International

WORLD-WIDE OIL DEVELOPMENTS

California Standard Plans Construction Of Refinery Near Alexandria, Egypt

NEW YORK. — Indicating that no substantial quantities of Middle East crude oil would be coming into the United States in the immediate future—at least from companies affiliated with Standard Oil Co. of California—R. G. Follis, president of California Standard, told a press conference here last week that his company is definitely planning to construct a refinery, which will operate on Middle East crude, near Alexandria, Egypt.

Whether the terminus of the projected transArabian pipe line will be in Egypt, Syria or Palestine depends on conclusions reached from uncompleted ground surveys, Follis stated. If the terminus is not in Egypt, then tankers will be employed to haul the crude from either Syria or Palestine.

Construction of this line, which will be approximately 1,200 miles long, is being delayed due to lack of the necessary materials, the California Standard president indicated. Political disturbances in the Middle East have not altered pipe-line construction plans, he added. The line will be built by Trans-Arabian Pipe Line Co., jointly owned by California Standard and The Texas Co., and will carry crude from Arabia's oil fields to the Mediterranean. Arabian American Oil Co. is owned by the same two U. S. companies. No additional information on the projected Egyptian refinery was given.

Current Saudi Arabian production is around 175,000 bbl. daily, Follis said, with the output being used in part by Bahrein Petroleum Co., Ltd. —on Bahrein Island in the Persian Gulf—with some shipments going to French and Swedish refineries. Bahrein Petroleum, also owned by California Standard and Texaco, operates a 100,000-bbl. refinery and is now running it at capacity, with about 20,000 bbl. daily of its throughput coming from production on Bahrein Island. Arabian production can easily be stepped up from the current 175,000 bbl. daily. The U. S. Navy is still drawing on the Persian Gulf area for about 50,000 bbl. daily of its fuel-oil requirements.

Regarding the adequacy of crude oil in the Western Hemisphere, Follis expressed belief the demand could be met from the combined fields of the United States, Venezuela, and other South American countries. He saw the Eastern Hemisphere as the logical marketing places for products from Middle East crudes. The California Texas Oil Co., Ltd., is the marketing subsidiary of California Standard and Texaco in areas east of the Suez Canal.

Touching on California Standard's recent purchase of a controlling interest in Barber Asphalt Co.'s Barber, N. J., refinery, Follis said that his company was not planning any extensive marketing plans along the East Coast. He pointed out that California Standard had sent surplus gasoline to this area before the war (by way of sales to Sun Oil Co.) and that this was employed as a "balance wheel" against periods of surplus on the West Coast. However, the California demand for gasoline now precludes the shipment of large amounts to the East Coast, he said.

Follis and R. C. Stoner, vice president in charge of production and a director of California Standard, have left the U. S. for a trip to their company's Venezuelan properties. In Venezuela, California Standard subsidiaries hold 2,750,000 acres of undeveloped concessions, largely on the western side of Lake Maracaibo and along the Orinoco River Delta.

Egloff Sees Rising World Consumption

ATLANTIC CITY.—The oil industry "will have to gear its sights much higher than it has in its estimates of future world oil consumption," according to Dr. Gustav Egloff, Universal Oil Products Co. Dr. Egloff, an internationally known petroleum technologist, spoke to the press here in an unscheduled conference following his recent return from an extended visit to the Scandanavian countries. He was attending the annual meeting of the National Petroleum Association.

Sweden is booming industrially, Egloff said, and all indications are that greater amounts of petroleum and its products will be needed there within the next 12 months. "Several refineries" are now being planned for Sweden and presumably will be run on Middle East crude from Iran and Kuwait, Dr. Egloff observed. South American crude may also be employed.

In all Scandanavian countries, the centuries-old wood economy is giving way to an oil economy. Compressed straw, sawdust, and dried peat will soon be driven out entirely in so far as their use as fuel is concerned, Dr. Egloff said. At present, Sweden has no indigenous oil production, but large-scale plans are under way for exploration.

Recently, a private Swedish concern hiked the octane rating of gasoline being marketed there to 80 oct. and sold it at no increase in price. This move has given added impetus to plans for improving the quality of gasoline and to demands for tetraethyl lead, which had not been used in Sweden until this recent date, Dr. Egloff explained.

From other sources, it has been learned that about $15,000,000 will be expended on new refinery construction in Sweden.

Another development in the Swedish petroleum industry are plans for blasting underground rock storage tanks.

During the war, Sweden spent 100,000,000 krona (about $27,000,000 at the then-prevailing rate of exchange)

on shale-oil equipment, and while this equipment continues to turn out around 2,000 bbl. daily, it is not known whether the Government will continue its operation in view of lower-cost petroleum from other sources, Egloff explained. At any rate, it was pointed out that industrial developments like this indicate that "the oil reserves of the world are sufficient for centuries to come."

Plans are also under way for additional refinery construction in England, Denmark, and Norway, Dr. Egloff said. With England converting rapidly from a coal to an oil economy, the oil demands there will continue to mount. And whatever increased demands England may have, she can easily draw on the oil reserves of Iran and Kuwait, he said, adding that the speed with which English industries converted would depend on the availability of conversion equipment.

Parker, Elliott Named to Top Standard Vacuum Posts

NEW YORK.—Philo W. Parker and Lloyd W. Elliott have been named board chairman and president, respectively, of Standard Vacuum Oil Co., a subsidiary of Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc. C. E. Meyer and C. K. Gamble were elected vice presidents.

Parker, former Standard-Vacuum president, who succeeds George S. Walden, retired, has been with Jersey Standard since 1912. In 1933 he joined the foreign affiliate as a vice president. Elliott, former vice president, served during the last war as a colonel in the South Pacific. Before the war he was manager of Standard Vacuum's Netherlands East Indies affiliate, Nederlandsche Koloniale Petroleum Mij.

Meyer, former petroleum attache in the U. S. Embassy in London and prewar manager of Standard Vacuum's operations in Japan, was interned after Pearl Harbor but returned to the United States in 1942. Gamble, who has represented the company in Turkey, Syria, Greece, Australia, and New Zealand, served as high commissioner for the American Red Cross in South and Southwest Pacific for 3½ years during the war.

Seven Bolivians Named to YPFB Directors' Board

NEW YORK.—Names of the seven Bolivians named to the board of directors of Yacimientos Petroliferos Fiscales Bolivianos (Bolivian Government Oil Fields) were released here this week by A. J. Machicao, YPFB representative. They are:

René Ballivián C., president; Jorge Muñoz R., vice president, and representative of Bolivian Development Corp.; Jorge Gosalvez S. and René Ascarrunz D., both representatives of the national government; Alejandro Calderón, representative of Banco Central; Raúl Canedo R., director-general of mines and petroleum; and Alcides Molina, comptroller-general.

Army Air Forces Awards Oil Contract to Intava

WASHINGTON.—A contract to deliver aviation gasoline and lubricating oil in 43 countries has been formalized by the Army Air Forces and Intava, Inc., it was announced recently. Intava, Inc., jointly owned by Socony-Vacuum Oil Co., Inc., and Standard Oil Co. (N. J.), markets the products of the two companies outside the United States. The contract obligates funds in excess of $5,000,000.

Colon Production Up

CARACAS. — Total production of Colon Development Co., Ltd., a Shell Oil Co., Inc., subsidiary, was 523,073 bbl. for the 5 weeks ending September 2, compared to 422,668 bbl. for the 4 weeks ending July 29. Daily production averaged 14,944 bbl. compared with 15,095 bbl. daily for the period ending July 29.

International

WORLD-WIDE OIL DEVELOPMENTS

Japan's Wartime Aviation Gasoline Industry Reviewed

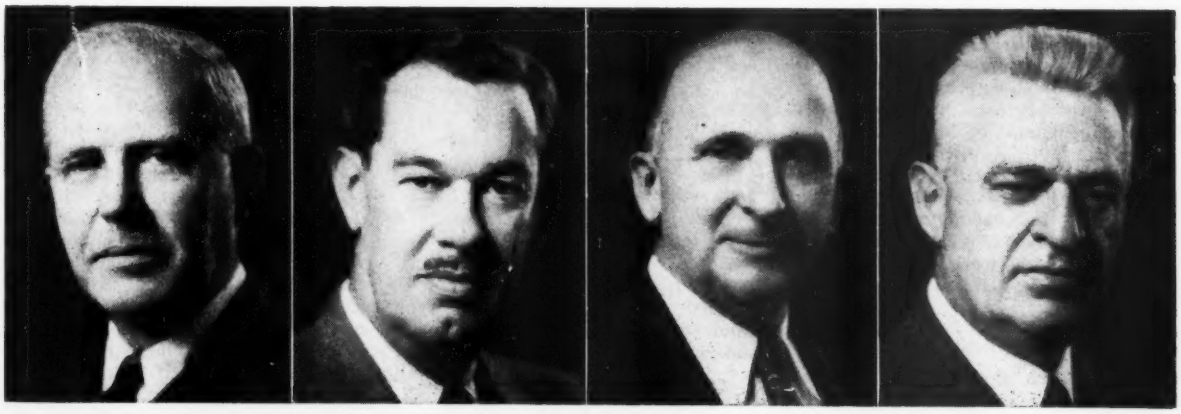
Japan's aviation-gasoline production reached a wartime peak of 16,000 bbl. daily but inability to move crude oil from the East Indies to home-island refineries seriously impeded military operations from 1944 to end of the war.

These were highlights of a report on Japan's wartime petroleum industry presented at a recent meeting of the California Natural Gasoline Association by Jan G. Schaafsma, General Petroleum Corp., and a member of the U. S. Strategic Bombing Survey Committee.

At start of the war, Japan's petroleum resources consisted of 45,000,000 bbl. of crude oil and products in storage; a domestic production of 7,000 bbl. per day from some 5,000 wells, located principally on the Island of Honshu; and refineries capable of processing 90,000 bbl. of crude daily.

As a result of wartime construction, refining capacity was eventually built up to 115,000 bbl. daily, Schaafsma said. Likewise, Japan's prewar synthetic-fuel industry was expanded and at its peak accounted for about 4,000 bbl. daily of motor fuel and diesel oil from coal. Japan's synthetic fuel was produced partly by the Fischer-Tropsch process and partly by coal hydrogenation. Substitute-fuel production, principally from alcohol, was also developed during the war but did not exceed 6,000 bbl. daily at any time.

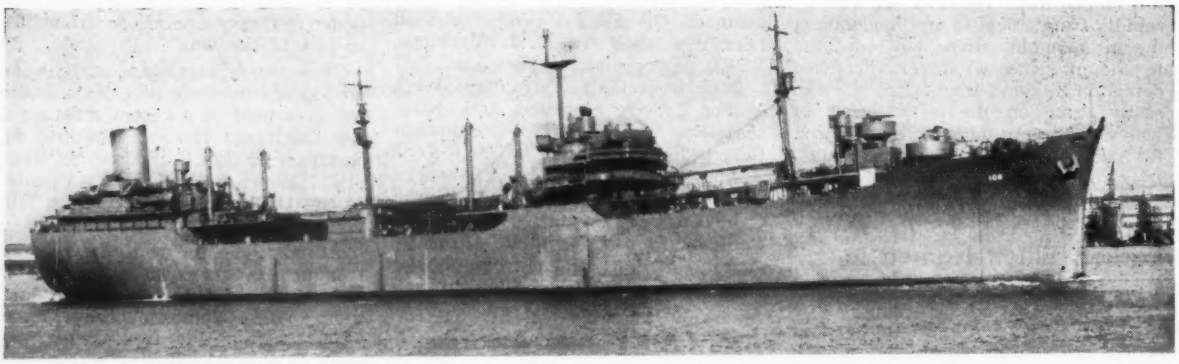
Although Japan succeeded in restoring the East Indies oil production to about 80 per cent of its prewar level, it was impossible to transport substantial quantities of either crude or products to the home islands.



PHILO W. PARKER — LLOYD W. ELLIOTT — C. E. MEYER — C. K. GAMBLE

Year End Will Probably Find Maritime Commission Out of Tanker Business

by Warren W. Burns



Many tanker authorities consider only the T3-type would be economical for Middle East-U. S. East Coast runs. Above is the T3 S.S. "Sun Oil"

NEW YORK.—Whether the United States Maritime Commission remains in the tanker business at the end of this year depends on world requirements.

Well-informed sources have told The Journal that there will be an adequate number of tankers in private hands before 1947 rolls around. However, it is admitted that undisclosed Army and Navy plans might necessitate the continuance of voyage chartering, although tanker sources think it significant that the rate question has not been brought up for consideration. Early in September it was learned that the Maritime Commission was circulating a letter—addressed to Rep. Schuyler O. Bland (Dem., Va.), chairman of House Merchant Marine and Fisheries Committee—for approval among Maritime Commission officials in which a plan was outlined for bareboat chartering of Government-owned tankers. Congress would have to amend the Ship Sales Act before bareboat-tanker chartering would be legal. But if the Navy shifts to destination contracts, this may alter Maritime Commission thinking as to whether bareboat chartering will be needed to supplement privately-owned tankers. Applications to buy the Government's surplus tankers have fallen far below expectations.

Tanker Applications Listed

A late check of the Maritime Commission reveals that the following applications for tanker purchases have been made:

International

WORLD'S LARGEST TANKER

NEW YORK.—D. K. Ludwig, owner of Welding Shipyards, Inc., Norfolk, Va., is building a 26,000-dwt. tanker with dimensions of 581 by 80 by 41 ft. This will be the largest tanker in the world and capable of carrying approximately 190,000 bbl. of crude or 215,000 bbl. of gasoline. Reliable sources state that it is being built for the Middle East trade.

Type—	Applications — Citizen	Non-citizen	Total	Total available
Z-ET1 (Liberty)	1		1	61
T1-MB	1	6	7	31
Special T2	2		2	4
T2-SE-A1	35	42	77	421
T3-S-A1	15	2	17	5
Special T3	3		3	2
Total	57	50	107	524

As indicated from above figures, the rush has been for the T3 type tanker with 17 applicants seeking 5 tankers. The noncitizens' applications, in this case, will be considered and the Maritime Commission presumably will allocate them in some manner which aims to bring the applicant's prewar tonnage as near normal as possible.

During the war, the United States built 63 T3 type tankers and lost, through enemy action, only three. Of the remaining 60 tankers in this class, the Navy has approximately 22. The T3 tankers (18,300 dwt.) can carry 150,000 bbl. of crude and about 165,000 bbl. of gasoline. Speed of the T3 tankers is 18 knots. The T2 tanker, whose speed is 14.5 knots, can carry 120,000 bbl. of crude and around 135,000 bbl. of gasoline.

When and if tankers start "shuttling" between the Middle East oil fields and the U. S. East Coast, only the T3 type tanker would be economical, according to one well-informed source who adds that the T3 tankers also would have to be under foreign registry—due to the mounting labor costs of U. S. crews. To date the only Middle East crude to reach the United States came in August 18 when the Gulf Oil Corp.'s Philadelphia refinery received 115,000 bbl. from Kuwait. This crude was shipped on a Maritime Commission tanker at a cost of $13.05 per ton, or about $1.76 per bbl.

Shipping costs of Middle East crude to the United States undoubtedly will be lowered with completion of the projected trans-Arabian pipe line, work on which is being held up pending some solution to the thorny Palestine problem. Rumors that this line might not be built if the Suez Canal lowered its tolls have been pretty well quashed with the recent disclosure that Suez Canal officials not

only do not contemplate lowering the tolls, but as a matter of fact are considering a hike. Unofficial cost estimates of moving Middle East crude to the East Coast, on completion of the trans-Arabian line (to some Mediterranean port, possibly Haifa), indicate that it could be done with a profit of approximately 30 cents per barrel.

Assuming that the movement of Middle East crude should commence on some type of a regular basis before completion of the projected 1,200-mile pipe line, a T3 tanker's turnaround time, for example, from New York to Abadan in the Persian Gulf —a distance of about 8,550 miles— would be approximately 39.6 days, plus 3 days for port time, or a total of 42.6 days. In contrast, the turnaround time of a T2 tanker (which would be carrying 30,000 bbl. less of crude) would be 52.2 days for the same distance.

Turnaround time from New York to Port Said, at the Mediterranean end of the Suez Canal, for a T3 tanker would be approximately 26.8 days and for a T2 tanker 32.6 days. For purposes of comparison, the turnaround time from the U. S. Gulf Coast to the East Coast—including 3 days of port time—would be 13 days for a T3 and 15 days for a T2 tanker.

British, Swedish Shipbuilding

Regarding construction of tankers outside of the United States, a rapid pace is being set by both Britain and Sweden with Sweden now building three new yards as part of her shipconstruction expansion program. Swedish shipyards are booked into 1950 with domestic and foreign orders, many of the orders being for tankers. Norway finds it more economical, for instance, to have her ships built in Sweden where the advantages include low wages for skilled labor and no strikes. Norway's net reduction in tanker tonnage during the war was 33 per cent.

Indicative of the pace being set in Britain's shipyards is the fact that by the end of this year the British Tanker Co.'s fleet will exceed its prewar tonnage of 980,000 dwt. The British Tanker Co. is a subsidiary of Anglo-Iranian Oil Co., Ltd. During the war Anglo-Iranian lost 44 tankers but shortly will have brought its postwar fleet up to 112 vessels—or 22 more tankers than she owned before the war. Standard Oil Co. (N. J.) had 205 tankers before the war, lost 84 through enemy action and today is running approximately 156. The prewar tanker fleet of Royal Dutch-Shell consisted of 178 ocean-going vessels with a total deadweight of 1,524,000 tons. About 72 tankers were lost through enemy action. When all tankers on order are delivered, the Royal Dutch fleet will be only 2 per cent or 35,000 dwt. smaller than the prewar fleet.

During the first 6 months of this year, the construction of 127 tankers was completed in Great Britain, and as of last June, 311 were under construction. These are ships of 1,600 gross tons or over. In 1945, a total of 181 tankers slipped off British ways. During the war years Britain completed the following number of tankers (figures include Canadian construction): 1940 — 36; 1941 — 276; 1942—312; 1943—174; and 1944—180. The British admiralty is the source of these figures.

Another indication of the rapid growth of the world tanker fleet is the fact that during the period September 1, 1945, to June 30, 1946, a total of 138 tankers were added. The 138 is a net figure and reflects the few ships which were scrapped. Last September the world tanker fleet stood at 1,911 compared with 2,049 as of June 30, 1946—the latest date on which world tanker figures are available. Table 2 shows tanker ownership by countries.

It will be noted in Table 1 that there is a difference of 47 United States owned or controlled tankers between December 31, 1945, and August 31, 1946. These may be accounted for as follows: 37 were scrapped, including one T2. Four were sold to foreign countries, one to Honduras and three to China. Three foreign-owned and time-chartered to War Shipping Administration were returned. Three probably were scrapped and declared constructive losses.

TABLE 1—UNITED STATES-OWNED OR CONTROLLED TANKERS PRIVATELY OPERATED
(1,600 Gross Tons and Over)

	As of Dec. 31, 1945				As of Aug. 31, 1946			
	Total		T2	T3	Total		T2	T3
	No.	Dwt.	No.	No.	No.	Dwt.	No.	No.
WSA-owned, privately operated	511	8,024,300	...	...	270	4,242,800	...	...
Privately owned, bareboat and WSA privately operated	18	209,000	...	...	...	...	...	...
Privately owned, time chartered to WSA, privately operated	39	543,900	...	...	...	...	...	...
Foreign-owned, time chartered to WSA, privately operated	3	35,500	...	...	...	...	...	...
Total WSA-control, privately operated	571	8,812,700	420	7	270	4,242,800	239	1
Privately owned, privately operated	238	3,386,600	37	16	301	4,184,200	51	16
Total active, privately operated	809	12,199,300	457	23	571	8,427,000	290	17
Inactive (reserve fleet	48	523,800	5	...	*313	4,601,400	202	5
Total civilian	857	12,723,100	462	23	884	13,028,400	492	22
Owned and operated by military (Army and Navy), (includes owned, operated, and bareboat)	171	2,048,300	36	22	97	1,239,700	23	22
Total civilian and military	1,028	14,771,400	498	45	981	14,268,100	515	44

*Contains a small amount of Panamanian and Honduran tonnage. Source: Division of economics and statistics, U. S. Maritime Commission.

TABLE 2—NUMBER AND DEADWEIGHT TONNAGE OF WORLD TANKSHIP FLEET BY COUNTRIES AS OF JUNE 30, 1946, INCLUDING LEND-LEASE*
(Including vessels of 1,000 gross tons and over.)

Flag—	No.	Dwt.
United States (including military)	1,005	14,001,700
British	468	4,280,400
Argentine	28	235,700
Belgium	5	55,000
Brazil	5	44,000
Chile	3	12,100
China	4	46,000
Columbia	1	3,100
Denmark	11	136,200
Finland	1	12,000
France	28	295,500
Germany	10	111,300
Greek	4	27,400
Honduras	3	27,400
Italy	19	147,800
Japan	12	77,600
Mexico	10	93,200
Netherlands	71	509,400
Norway	178	2,269,300
Panama	76	831,800
Peru	1	4,300
Portugal	4	27,600
Spain	23	171,500
Sweden	40	526,500
Turkey	2	10,500
Russia	37	283,600
Total	1,044	10,239,200
Total world	2,049	24,240,900

*Source: U. S. Maritime Commission.

Plans Progressing for Venezuelan Pipe Line

Creole Petroleum Corp. is moving ahead with plans to build a 26-in. crude-oil pipe line from La Salina in the Lake Maracaibo area to Paraguana Peninsula, in Venezuela.

It was reported Creole has placed an order with Cooper-Bessemer Corp. for 16 of its Type LS-8-cylinder gas-diesel and diesel engines.

The pipe line is to be used primarily to transport crude to the company's projected refinery of 60,000 bbl. daily capacity at Amuay Bay, a distance of approximately 150 miles. From the plant, oil will be pumped to tanker loading docks in the same vicinity.

Leaders of the Petroleum Division, American Institute of Mining and Metallurgical Engineers, include H. F. Beardmore, division chairman; H. H. Kaveler, chairman of the committee on papers and programs; and Haylett O'Neill, chairman of a Gulf Coast Section committee arranging for hospitality and entertainment at the Galveston meeting

A.I.M.E. Petroleum Engineers to Meet in Galveston, October 3-5

PETROLEUM engineers from all parts of the United States will gather in Galveston, Tex., October 3-5 to participate in first of two annual fall meetings of the Petroleum Division, American Institute of Mining and Metallurgical Engineers. The second fall meeting of the division will be held in Los Angeles October 24-25.

The Galveston meeting, at the Galvez Hotel, has been designated the official business meeting and will be the place of open and executive meetings of the general committee, and of the numerous technical committees. Equipment and service companies will exhibit at the meeting.

The technical program, announced by Herbert F. Beardmore, Barnsdall Oil Co., Tulsa, was arranged by a committee headed by Dr. H. H. Kaveler, Phillips Petroleum Co., Bartlesville, Okla, and including Dr. E. R. Brownscombe, Atlantic Refining Co., Dallas; Harold Decker, Pan American Production Co., Houston; A. W. Baucum, The Texas Co., Tulsa; Howard C. Pyle, Bank of America, Los Angeles; Earl M. Kipp, California Co., New Orleans; and M. Muskat, Gulf Research & Development Corp., Pittsburgh.

The Gulf Coast Section, Mercer H. Parks, Humble Oil & Refining Co., Houston, chairman, will act as host. Arrangements for hospitality and entertainment, including receptions, banquet, dance, and fishing parties, have been made by a Gulf Coast Section committee under Haylett O'Neill, Humble Oil & Refining Co., Houston. Registration will be handled by a committee headed by Oliver W. Fowler, Pan American Gas Co., Dickinson, Tex.

The technical program consists of 14 papers detailing recent investigations and advances in the science of oil-well drilling, completion, and production, and researches in reservoir engineering.

The program follows (rooms refer to the Galvez Hotel, meeting headquarters):

Thursday, October 3

8 a.m. — Registration of members and guests, hotel lobby.

8:30 a.m.—Breakfast meeting of divisional officers, presiding officers, and authors of papers to be given during the day. Anchor Room.

9:30 a.m.—Technical session, Convention Hall, Mercer H. Park, presiding, R. C. Earlougher, cochairman. "Material-Balance Method of Evaluating Pressure-Maintenance by Internal Gas-Injection in Tight Volumetrically Controlled Reservoirs," E. Charles Patton, Jr., Magnolia Petroleum Corp., Dallas; "Protecting Oil-Storage Tank Bottoms With Magnesium," J. R. James and R. L. Featherly, Dow Chemical Co., Midland, Mich.; "Use of Helium as a Tracer in Oil and Gas Reservoirs," E. M. Frost U. S. Bureau of Mines, Amarillo, Tex.

2 p.m. — Technical session, Convention Hall, John Murrell, presiding, H. F. Beardmore, cochairman. "Extending the Application of Electric Analogy in Oil-Reservoir Studies," Henry Schaefer, Stanolind Oil & Gas Co., Tulsa; "A New Method for Measurement of Oil Saturation in Cores," R. L. Boyer, F. Morgan, and M. Muskat, Gulf Research & Development Corp., Pittsburgh; "Interstitial Water by the Capillar Pressure Method," O. F. Thornton, The Texas Co., Houston, and D. L. Marshall, The Texas Co., New Orleans; "Phase Relations in Hydrocarbon Water Systems," Donald L. Katz, University of Michigan, Ann Arbor, and John J. McKetta, University of Texas, Austin.

12:30 p.m.—Ladies luncheon.

3 p.m.—Ladies boat ride in Galveston Bay.

5:30 p.m.—Informal reception and refreshments, Convention Hall.

Friday, October 4

8 a.m.—Breakfast meeting, divisional officers, presiding officers, and authors appearing on technical sessions during the day. Anchor Room.

8:30 a.m.—Continuation of registration.

9 a.m. — Technical session, Convention Hall, Riley A. Aucoin, presiding, Charles B. Carpenter, cochairman. "Review of Geophysical Prospecting Devices, Methods, and Procedures," Paul Weaver, Gulf Oil Corp., Houston, and C. H. Dresbach, Western Gulf Oil Co., Los Angeles; "A Study of Some Factors Affecting Gun Perforating," S. C. Oliphant, Stanolind Oil & Gas Co., Houston, and R. Floyd Farris, Stanolind Oil & Gas Co., Tulsa; "Engineering Developments in Southwest Texas," John W. Crutchfield and Horton T. Pruett, consulting petroleum engineers, Corpus Christi, Tex.; "Consolidation of Loose Sands With Plastics," Ralph Smith and A. C. Polk, Jr., Dowell, Inc., Houston.

1:30 p.m.—Technical session, Convention Hall, Eugene Fisher, presiding, Claude R. Hocott, cochairman. "Geothermal Gradients in Mid-Continent and Gulf Coast Oil Fields," Earl A. Nichols, Core Laboratories, Dallas; "Marine Drilling in Venezuela," James A. Clarke, Creole Petroleum Corp., New York; "Effective Technical Group Speaking," A. Ross Rommel, Humble Oil & Refining Co., New Orleans.

9 a.m.—Ladies pier-fishing party.

3 p.m.—Open meeting of the general committee of the petroleum division, following the technical session in the Convention Hall.

5:45 p.m. — Cocktail party, Convention Hall.

7 p.m. — Division banquet, Herbert F. Beardmore, chairman, Petroleum Division, presiding, Main Dining Room.

Saturday, October 5

Deep-sea fishing by individual arrangements.

9:30 a.m. — Executive meeting, general committee, West Room.

Preparations Complete for Meeting of A.A.O.D.C.

Final arrangements were being made this week for the sixth annual meeting of the American Association of Oilwell Drilling Contractors which will open October 1 at the Plaza Hotel in San Antonio.

More than 600 drilling contractors and representatives of allied phases of the petroleum industry are expected. The association announced all San Antonio hotels are cooperating in housing the visitors at the 2-day meeting.

A well-rounded program includes business and technical sessions as well as entertainment. Wives of the visitors will be entertained at a lunch and taken on a tour of the city. Association officers will be elected October 1 and installed at the annual luncheon the following day.

The program for the meeting was published on page 161, The Oil and Gas Journal, September 21. Reports of papers presented will be published in a special section of the Journal's October 5 issue.

Louisiana Hearing Set

BATON ROUGE.—Proposed water injection for Pettit Zone pool in Haynesville field, Claiborne Parish, Louisiana, will be the subject of a hearing October 1 before Joseph L. McHugh, Louisiana Conservation Commissioner.

Wide Range of Subjects Features A.S.M.E. Program at Tulsa

WITH its program for the 1946 conference of petroleum mechanical engineers arranged to include discussions on a wide range of technical subjects of timely interest to all engineers in the oil industry, the American Society of Mechanical Engineers opens its 3-day meeting October 7 at Hotel Mayo in Tulsa. Registration of members and nonmembers is scheduled for Monday morning, October 7.

Some of the nation's top engineers in the refining, transportation, and production branches of the industry have been obtained for the technical program. Other outstanding authorities in the equipment and construction material fields have been selected to discuss problems concerning application, maintenance, and function in the respective groups. Several group discussions on important subjects will highlight the meeting. At the symposiums, recognized authorities from both equipment and petroleum branches of industry will discuss subjects important to the various engineering groups.

On the social side of the program the Tulsa Engineers' Club will be hosts at a general luncheon Monday noon. Other events will include several luncheons, a smoker and buffet dinner, and an informal banquet. Inspection trips to refineries and oil-equipment manufacturers' plants will be available to those interested.

A condensation of the program follows:

Monday, October 7

9 a.m.—Registration.

12 m.—Engineers' Club luncheon, "Engineers and Human Affairs," D. Robert Yarnall, A.S.M.E. president.

2:30 p.m. — "Oil - conditioning session: "Modern Filtration and Purification Methods," F. M. Steele, Hilliard Corp., Elmira, N. Y.; "Centrifugal Purification," C. W. Bryden, DeLaval Separator Co.; "Gravity and Pressure Oil Filters, Their Uses and Application," E. M. May, Bowser, Inc. Construction-materials session: "Refinery Corrosion Problems," E. E. Kerns, Standard Oil Co. of Ohio, Cleveland; "Mechanical and Metallurgical Control of Sulfuric-Acid Corrosion in Petroleum Processes," E. R. Wilkinson, Louisiana Division, Standard Oil Co. of New Jersey, Baton Rouge. Refinery and equipment session: "Relief Valves, Their Function and Maintenance," John Gieseke, Crosby Steam Gauge Valve Co., Dallas; "Air-Operated Control Instruments," V. V. Tivy, Foxboro Co., Foxboro, Mass. Pumping session: "Factors Influencing the Selection of Equipment for Oil-Well Pumping," J. F. Field, Sohio Oil Co., Oklahoma City; "Trends in Surface-Pumping Equipment Design," S. M. Fetzer, Continental Supply Co., Dallas.

7:30 p.m.—Smoker and buffet dinner.

Tuesday, October 8

9:30 a.m.—Applications session: "Desirable Characteristics of Coating Liquids for Rotating-Screen and Panel-Type Air Filters," G. E. Cunningham, Dollinger Corp., Rochester, N. Y.; "Charging Fluids for Electrostatic Air Filters," C. A. Ellwood, Eastman Kodak Co., Rochester, N. Y. Construction-materials session: "Notched-Bar Impact Properties of Some Nickel Steels After 1-Year Exposure to Liquid Nitrogen," T. N. Armstrong and A. J. Miller, International Nickel Co.; "Some Notes on the Use of Free Machining Steels in Connection With Petroleum Equipment," M. E. Holmberg and F. Prange, Phillips Petroleum Co., Bartlesville, Okla. Pressure-vessel session: "Design and Pressure Vessels for High-Temperature, High-Pressure Reactor Service," E. W. Jacobson, Gulf Research & Development Co., Pittsburgh, and T. G. Beckwith, University of Pittsburgh; "Multilayer Construction of Pressure Vessels," O. R. Carpenter, Babcock & Wilcox Co., Barberton, Ohio. Drilling session: "Mid-Continent Mud Conditioning," G. C. MacDonald, Gulf Oil Co., Tulsa; "Recovery of Barite From Rotary-Drilling Mud by Centrifugal Separation," A. E. Zimmerman, Merco Centrifugal Co., San Francisco.

12 m.—Special-interest group luncheons.

2:30 p.m. — Asphalt-applications session: "Petroleum Asphalts in Pavements," William Raisch, consulting engineer, New York, and Leo Kampf, Borough of Queens Laboratories, New York; "Asphalts and Their Evaluation for Commercial Use," J. C. Roediger, Standard Oil Development Co., Elizabeth, N. J. Drilling session: "Controlled Directional Drilling of Wells," G. L. Kothny, Sperry-Sun Well Surveying Co., Philadelphia; "Development in Side-Wall Coring by the Rotary Method," J. R. Yancey, A-1 Bit & Tool Co., Houston. Pipeline pumping session: "Rotary Pumps in the Oil Industry," R. J. S. Pigott, Gulf Research & Development Co., Pittsburgh; "Cavitation in Pumps," B. R. Walsh, Gulf Research & Development Co., Pittsburgh; "Visual Demonstration of Cavitation as Viewed by Stroboscope," B. R. Walsh, Gulf Research & Development Co., Pittsburgh. Refining - equipment session: "Suspended Wall Linings for Catalytic Regenerators and T.C.C. Kilns," H. O. Johanson, M. H. Detrick Co., Tulsa; "Equipment for Low-Cost Oxygen Production," F. J. Jenny, Hydrocarbon Research, Inc., New York, and Martin J. Conway, Stacey-Dresser Engineer, Cleveland, Ohio.

7:30 p.m. — Banquet, "Operation Under Free Enterprise Has Made Our Mechanical Development Superior to Any Other Country," E. H. Moore, U. S. senator from Oklahoma.

Wednesday, October 9

9 a.m.—Production session: "Significance of Fluid Properties in Gas-Condensate Reservoir Engineering," C. K. Eilerts, Bureau of Mines, Bartlesville, Okla.; "Drilling-Equipment Needs," Douglas Ragland, Humble Oil & Refining Co., Houston. Pipe-line hydraulics session: "Some Performance Data on 20 and 24-in. Fluid Lines," A. N. Horne, Texas Empire Pipe Line Co., Tulsa, and R. P. Lennart, Stanolind Pipe Line Co., Tulsa. Refining session: "Some Mechanical Difficulties in High-Temperature Cracking and Suggested Solutions," E. W. Griscom, Sinclair Refining Co., Marcus Hook, Pa.; "Tube-Rolling Study," M. Q. Colton, Ohio Steel Foundry Co., Lima, Ohio. Construction-materials session: "Use of Stellite and Other High-Alloyed Materials to Combat Corrosion and Abrasion in the Petroleum Industry," C. G. Chisholm, Haynes Stellite Co., Kokomo, Ind.; "Wear Resistance of Gray Irons," F. G. Sefing, International Nickel Co.

2:30 p.m.—Refining session: "Hydraulic Decoking," A. F. Welsh, Worthington Pump & Machinery Corp., Harrison, N. J.; "New Developments in Compressors for Petroleum-Industry Applications," J. N. MacKenrick, Clark Brothers Co., Inc., Olean, N. Y. Tubular-equipment session: "A Study of the Corrosion of Copper-Alloy Condenser Tubes," N. W. Mitchell, Chase Brass & Copper Co., Waterbury, Conn.; "Heat Exchanger Design," D. E. Fields, Tulsa Boiler & Machinery Co.

Western Metal Congress To Be Resumed

Preliminary plans for resumption of the Western Metal Congress and Exposition have been completed and the event will be held in the San Francisco-Oakland Golden Gate area for 6 days beginning March 22, 1947. The last such event was held in Los Angeles in 1941.

The congress and exposition will again be sponsored by the American Society for Metals and will have the active cooperation of West Coast chapters of the nation's leading technical societies.

Technical programs will include lecture courses, technical papers, and round-table conferences of special interest to the metals, aviation, petroleum, chemical, mining and general manufacturing industries. Further announcements of this program will be made at a later date.

Texas Hearing Date Changed

AUSTIN. — Because the originally set date, October 18, conflicted with the Texas Mid-Continent Oil and Gas Association meeting in Houston, the Texas Railroad Commission has moved back to October 19 the date of its statewide hearing in Austin to set market demand for November.

Union Loses Tanker Claim

SAN FRANCISCO.—Union Oil Co. of California last week lost its claim for $1,600,000 against the War Damage Corp. The company sued for recovery of cost of a tanker, the Montebello, which was sunk off the central California coast December 23, 1941. The suit was a test case to determine the government's liability for ships and cargo lost through enemy action.

California Properties Sold

LOS ANGELES. — Shell Oil Co., Inc., and General Petroleum Corp. of California have purchased the holdings of Lyman C. Hisey, Hisey Petroleum Corp., and Alliance Petroleum Corp. in the Ventura Avenue field, 60 miles north of Los Angeles, for a reported consideration of $1,246,000,000. Shell will be the operating company.

Wilson Advocates Continuance Of Cooperative Research

NEW YORK.—Continuance of cooperative research between the automotive and petroleum industry was advocated here last week by Dr. Robert E. Wilson, board chairman of Standard Oil Co. (Ind.), while speaking at the twenty-fifth anniversary dinner of the Coordinating Fuel Research Committee.

"The formation of the C.F.R. Committee," Wilson said, "was the logical and even inevitable result of recognition by the two industries that engine behavior and fuel properties not only cannot be completely separated but in many cases cannot be shown to exist apart from one another."

Others on the program included C. E. Davis, vice president in charge of manufacturing, Shell Oil Co., Inc.; T. B. Rendel, assistant manager, aviation department, Shell Oil; J. B. Macauley, engineering research director, Ethyl Corp.; W. R. Boyd, Jr., president, American Petroleum Institute, and J. A. C. Warner, general manager and secretary, Society of Automotive Engineers.

"Cooperative research carried on by the automotive and petroleum industries has not only solved many important technical problems in fitting fuels to engines and vice versa, but has educated the leaders of technical thought in each industry with regard to the technical and economic background of the other industry," Dr. Wilson said. "This was the most important factor in eliminating the buck-passing and unwarranted criticism between the industries which prevailed around 1932 in favor of real cooperation and mutual understanding, to the great benefit of the public."

Calling for a continuation of this cooperative research, Dr. Wilson said the problems of national defense make even more important "this bond between the automotive and petroleum industries."

The most conservative predictions for automobile use indicate that in another 10 years or so, some 40,000,000 passenger vehicles will be roaming the streets and highways. In addition, the Standard of Indiana board chairman expects greatly expanded dieselization of the railroads as well as of marine power and other power uses. These conditions, he said, will contribute significantly increased demands for highly specialized fuels.

"To attempt to predict the demands of aviation," he continued, "leaves one a little flabbergasted when he views the various plans now afoot for commercial aircraft and particularly for military aircraft," he said.

Dr. Wilson emphasized the nature of four principal problems to which he believes the Coordinating Fuel Research Committee will devote its attention in the period ahead:

Fitting high-octane number fuels and high-performance engines.—"The very highest knock-rating fuel components that we know of today are, in general, sensitive materials, the best use of which must call for coordinating with engine design to a much closer degree than in the past."

Fitting aviation jet engines and fuels.—"Granting that the present-day jet engine can do things that other power plants cannot, there is still much room for improving its efficiency. Just as the piston engine was made far more useful by increases in compression ratio, by supercharging, and by refinements that improved efficiency of air utilization, it seems to me that the efficiency and reliability of the jets or turbo-jets is bound to be improved by research to better fit the fuels and engines."

Diesel engines and their fuels.—"For many years a diesel engine was an omnivorous device that could operate on anything that could be pumped through a pipe and on some things that could not. Now principal interest centers in particular forms of diesel engines from which high specific outputs are exacted and which we find are anything but omnivorous. The problems of preparing fuels to get the best results from these diesels are serious and likely to increase."

Research on the mechanism of combustion.—"A serious attack is needed upon the fundamental mechanisms and chemistry of combustion, from the standpoint both of fuel composition and of the parts played by conditions of utilization. The C.F.R. has inspired much good work along these lines in the past, but the fundamental mechanism of combustion and knocking is still obscure."

Phillips Contracts for Gas; Jefferson Interests Sold

Oil and gas properties were involved in two transactions taking place in Texas last week. Paul H. Pewitt, Longview, was reported to have purchased half interest in Jefferson Oil & Gas Co. at Jefferson, while in Amarillo, Phillips Petroleum Co. closed a contract with Taylor Oil Co. for the entire gas output of the Taylor ranch in Gray County.

The Jefferson company holdings include a block of 3,000 acres in Marion County on which three producers have been completed, two for gas and one for oil. Consideration was reported as $160,000. Pewitt also was reported to have purchased from Sklar Oil Corp. five Rodessa wells north of Jefferson. The contract signed between Phillips and Taylor was said to call for the drilling of all wells on the 27,500-acre ranch by Taylor and a price ranging upwards from 3 cents per 1,000 cu. ft. to be paid by Phillips. Eight gas wells are already in production.

Lead Allocation Unchanged, But Supply Outlook Poor

WASHINGTON.—No reduction in the allocation of metallic lead for the production of Ethyl fluid has been made by the Civilian Production Administration. Fourth-quarter allocations give a quota of 11,000 tons for the production of tetraethyl lead during the last 3 months of this year, the same as the third-quarter allocation.

This action, however, does not assure production of ample Ethyl fluid for raising the octane rating of motor gasoline because Ethyl Corp. has been unable to purchase as much lead as permitted by its allocations. During August, it is understood, Ethyl Corp. was able to purchase less than 2,000 tons of lead compared with its quota of nearly 4,000 tons, and its stock piles are greatly reduced. A company official has been quoted as saying Ethyl may be unable to purchase more than about 2,000 tons per month the balance of this year.

Government officials are still attempting to increase production of primary and scrap lead since all users are facing a shortage but there is little prospect of an increase in supply.

(A part of Ethyl Corp.'s report on the seriousness of the lead-supply situation is given in the account of the National Petroleum Association meeting, page 55.)

Sohio Petroleum to Buy Properties in Kansas

WICHITA, Kans.—Sharon Drilling Co., Wichita, is preparing to sell its producing and undeveloped properties in Rice, Barton, Russell, and McPherson counties, Kansas, to Sohio Petroleum Co., according to reports here.

Titles are now being checked for consummation of the sale. Sharon's 15 wells in unprorated pools are making about 750 bbl. daily, and its 10 wells in prorated pools about 330 bbl. daily.

WASHINGTON WATCHING

BY HENRY D. RALPH

Henry Wallace on Oil

WASHINGTON.—National petroleum policy had a part in the latest crisis in President Truman's cabinet, though oil was not a major issue as it was last spring when the President relieved Harold L. Ickes as secretary of the interior because of his opposition to the appointment of Oilman Ed Pauley as assistant secretary of the navy.

Some snide insinuations about our oil policy were made by Secretary of Commerce Henry A. Wallace in his famous Madison Square Garden speech which led to the President's request for his resignation. In this speech Wallace attacked the administration's foreign policy of a stiff attitude toward Russia and advocated instead acceptance of a Soviet sphere of influence by what critics described as an appeasement program. With reference to oil, Wallace said:

"We most earnestly want peace with Russia—but we want to be met halfway. We want cooperation. And I believe that we can get cooperation once Russia understands that our primary objective is neither saving the British Empire nor purchasing oil in the Near East with the lives of American soldiers. We cannot allow national oil rivalries to force us into war. All of the nations producing oil, whether inside or outside of their own boundaries, must fulfill the provisions of the United Nations Charter and encourage the development of world petroleum reserves so as to make the maximum amount of oil available to all nations of the world on an equitable peaceful basis—and not on the basis of fighting the next war."

Serious Implications

It was not this paragraph that caused the split in the cabinet, but this language is typical of Wallace's entire attack on our foreign policy. It might be explained as simply rabble-rousing buncombe in a political speech to a left-wing audience which wants to be told that "national oil rivalries" cause war, but the implications are too serious to be dismissed lightly.

Facts are that the United States has never "purchased oil in the Near East with the lives of American soldiers," nor threatened to do anything of the sort, and spreading this kind of loose talk injures both the administration's foreign policy and the reputation of the American oil industry.

As for Wallace's demand that the world's oil reserves be developed for peace, that is the expressed objective of the Anglo-American petroleum treaty and the State Department's proposal that it be extended to other nations. The only aspect of our petroleum policy which might be termed preparation for the next war is the 30-year-old and practically insignificant Naval Petroleum Reserves program.

Another Reorganization?

SECRETARY Wallace's departure again leaves the Commerce Department with an uncertain future, lacking a definite program, and facing another reorganization—or about the same position it has been in for the past decade or more.

There was a time when Commerce was much practical value to businessmen, particularly those engaged in foreign trade, but in recent years its aid has been routine and perfunctory, while the State Department assumed most of the activities connected with the foreign problems of American business. Each successive secretary of commerce has announced a new plan to revitalize the department and develop new services to business, both foreign and domestic, but never quite got the department off dead center.

Wallace started with a very ambitious program, including a serious attempt to break down what he realized was general business distrust of his "leftish idealism." His plans were too ambitious for an economy minded Congress and the appropriations he received were so far below his budget requests that he had to trim his program drastically. Still the morale of the department was rising and its services expanding.

The new appointee, W. Averell Harriman, is quite familiar with the activities of the Commerce Department, having served as chairman of its business-advisory council for several years, though during the war his government connections have been in the diplomatic field. As special envoy of the president with rank of minister, Harriman assisted in lend-lease and other international problems, then served as ambassador to Russia and more recently ambassador to England.

Harriman was in business all his life until he came to Washington with the NRA in 1933, but his connections have been with big industry and chiefly with the financial end.

Speakers for I.P.A.A.

A CLOSER understanding between government oil policy makers and domestic producers may result from the attendance of Charles B. Rayner, petroleum adviser of the State Department, and Col. G. H. Vogel, executive officer of the Army-Navy Petroleum Board, at the convention of the Independent Petroleum Association of America next month. Both officials are going to speak and also listen, and the exchange of views, both formal and informal, may result in eliminating some of the apparent differences in views toward an acceptable national oil policy.

Since the August 17 broadcast in which these two officials discussed various aspects of a long-range program, there has been a fear in some parts of the industry that the government's policy is veering toward major reliance on imports rather than development of domestic resources. As a step toward clarifying this matter the I.P.A.A. has twice asked the State Department to call an industry conference to discuss import policy, but without affirmative results.

International-Trade Plans

THE oil industry will be little affected, and only indirectly, by the proposal for an International Trade Organization announced by the State Department last week.

The proposal is for a body operating under the United Nations to promote world trade by inducing all nations to lower tariff barriers, exchange restrictions, and other obstacles to the free flow of commerce.

The proposed charter of the I.T.O. is only tentative, public hearings will be held some time this winter at which American industries and traders can express their views. In connection with the I.T.O. the Government will attempt to negotiate reciprocal trade agreements with a dozen or more nations simultaneously, at which each country will agree to cut certain duties in exchange for reciprocal reductions by the others. A list of commodities on which the United States will be willing to make tariff concessions will be issued well in advance of these negotiations, and public hearings will be open to all interested parties, both importers and domestic producers.

While it is possible that oil tariffs might enter these negotiations it is

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highly improbable, because none of the nations engaging in the conference is expected to have special interest in seeking a reduction in the already low U. S. import tax on crude and petroleum products. Exporters of oil products, however, might benefit somewhat by general reductions in the trade barriers of other nations.

Of greater potential interest to the oil industry, though of equally long range, is this Government's suggestion that the United Nations call an international scientific conference on resource conservation and utilization. The suggestion was made in a letter from President Truman to John G. Winant, American delegate to the U. N. Economic and Social Council.

There was no hint of international control or supervision of resources in the President's letter, as he described the conference as an exchange of thought and experience.

"The real or exaggerated fear of resource shortages and declining standards of living has in the past involved nations in warfare," the President wrote. "Every member of the United Nations is deeply interested in preventing a recurrence of that fear and of those consequences. Conservation can become a major basis of peace. Modern science has itself become a major international resource which facilitates the use of other resources. Their adequate utilization can become a major basis of world prosperity."

Synthetic Rubber Economics

THE price of natural crude rubber in the United States is to remain unchanged at 22.5 cents per pound at least until January 1, 1947, under a directive issued by Stabilization Director John R. Steelman.

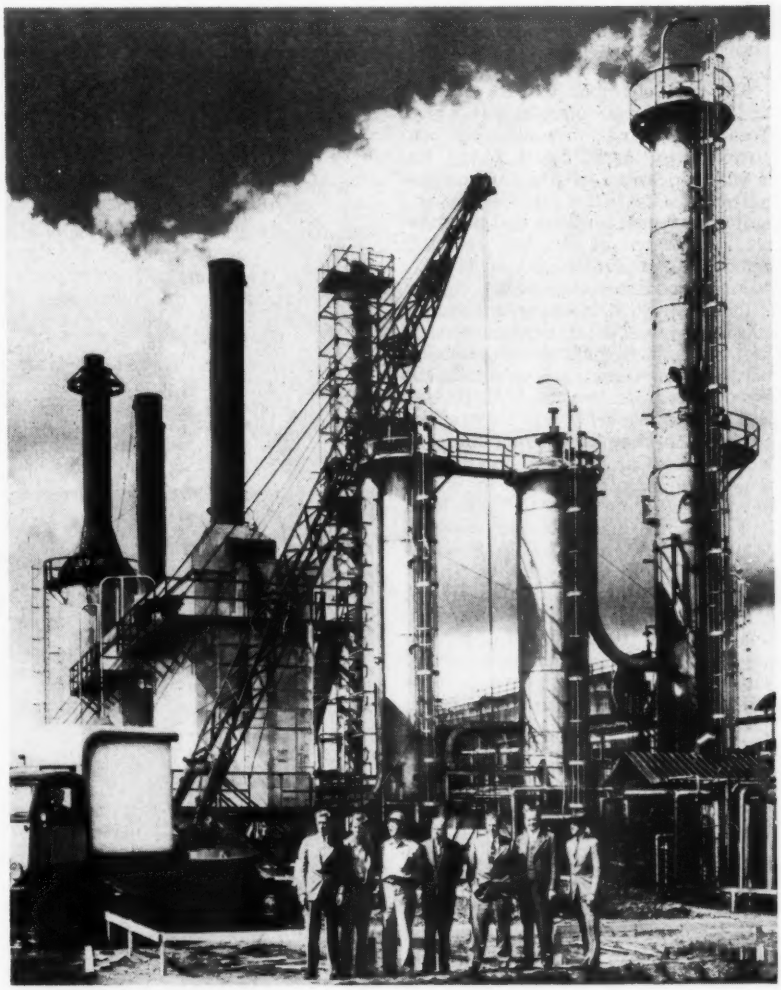
Reconstruction Finance Corp., the only importer at present, is now paying the world price of 26 cents per pound for rubber in the principal producing areas, and more than that in areas where special wartime production contracts are still in effect. However, it has on hand sufficient rubber to last out this year which was purchased at the wartime rate of 22.5 cents prior to the recent 3.5-cent increase in the Far East. Steelman ordered RFC to dispose of this at the purchase price on the grounds that it should neither make an inventory profit nor disrupt the rubber industry by a two-price system.

Government officials hope the world rubber price will decline in the near future, but if it does not the new price will be a big boost to the prospects of maintaining a large synthetic rubber industry in this country. The well-located and efficient synthetic-rubber and petroleum-butadiene plants can produce general-purpose rubber for 18 cents or less per pound.

Crude-Price Investigation

THE antitrust investigation of the 25-cent increase in the price of crude oil which went into effect when the OPA lid was removed is purely routine. Neither the Justice Department nor the oil industry appears excited about it. The investigation was asked by Rep. Henry C. Dworshak of Idaho, now running for the Senate, whose chief complaint was that the retail price of gasoline in his state went up more than in other parts of the country.

Complaints of possible antitrust violations always are looked into, but when a Congressman complains the D. of J. responds on the double quick, even though it doesn't expect to come up with a court case. The department appears satisfied with the oil industry's explanation that the crude price increase was long overdue and the 25-cent figure had been discussed publicly for several years. The only thing it doesn't like is the fact that virtually all crude buyers posted the same increase the same day throughout the country. This looks like a conspiracy in restraint of competition, but nothing is likely to be done.



Ground was broken recently for the construction of a small-scale catalytic cracking plant at Leonard Refineries, Inc., Alma, Mich. The unit, a Houdry-licensed Thermofor catalytic cracker, is being built by Catalytic Construction Co. under subcontract with Houdry Process Corp. and is expected to be completed before the end of the year. The Leonard unit will process 3,000 bbl. per day of charging stock and is designed with a per-barrel-investment and operating cost comparable to that of larger catalytic cracking plants. Houdry officials said the plant is the first postwar small-scale unit constructed. Shown in the photograph are Harmon J. Monnik, chief engineer, Catalytic Construction Co., and manager, mechanical-engineering division, Houdry Process Corp.; Charles Linck, construction field superintendent; John Sheller, field superintendent of Catalytic Construction Co.; John Pfarr, chief engineer, Leonard Refineries, Inc.; Alan T. Knight, vice president, Catalytic Construction Co.; Reid Brazell, president, Leonard Refineries, Inc.; and T. Ellwood Webster, president, Catalytic Construction Co. and vice president, Houdry Process Corp.

New Lab to Test Bottom-Hole Services to 10,000 Psi.

CONDITIONS equaling bottom-hole well completions to 10,000 psi. and 300° F. can be used in a new full-scale laboratory test well now being installed on the 20-acre central plant location of Dowell Incorporated at Tulsa. This will be used for research on oil-well-completion and rework services. Heart of the new facilities will be a 47,680-lb. steel test chamber, and apparatus is being fitted into a newly completed research building.

The test chamber is 26¼ ft. long and the internal diameter is 15 in. The vessel, made in multilayer construction by A. O. Smith Corp., has a wall thickness of 6½ in. and has been tested to 15,000 psi. The top and bottom are steel forgings and the overall appearance of the big vessel is somewhat similar to the large guns seen on modern battleships.

Inside the test building, a concrete subsurface well, 10 ft. in diameter and 24 ft. deep, will hold the steel chamber. Twelve General Electric Calrod electric strip heaters, each 12 ft. long and of 5 kw. capacity, will be wrapped around the chamber among mineral-wool insulating jackets to provide temperature control. Within the chamber three thermo wells are provided, and a centrifugal pumping system augmented by an air-to-liquid booster cylinder will supply the test pressure medium. An extensive series of electrical and hydraulic circuits with relays, diaphragm valves, and recording instruments are included so that any predetermined bottom-hole conditions can be continuously maintained.

Use of the large-size equipment, rather than "pilot plant" or miniature apparatus, is incorporated in the design so that sections of the commonly used sizes of oil-well casings and commercial models of well-completion-service equipment can be tested. Among the immediate applications for which the laboratory will be used are investigations of the setting of plastic plugs, sand consolidations by plastics, squeeze jobs, and cementing practices. Various acidizing tests will be made under the high pressures and temperatures available, and in the testing of electric pilots, water-location equipment, electric well calipers, and the new "spinner" (subsurface flow-rate indicator) surveys.

View of the 26¼-ft. by 28-in. o.d. high-pressure "oil well bottom" being lifted into its laboratory housing

Committee Says NPC Has Useful Function

WASHINGTON. — A recommendation that the National Petroleum Council can operate satisfactorily and perform a useful function was contained in the report of the temporary organizing committee presented to the council at its second quarterly meeting September 26.

The committee, headed by Walter S. Hallanan of Plymouth Oil Co., met Tuesday and prepared an unanimous report based on the findings of its subcommittees on procedure, scope, and legal problems. Chief discussion centered around the latest exchange of letters between Interior and Justice departments regarding the antitrust status of NPC, but it was generally agreed that the council could operate and be of service within the limited scope laid down.

However, many members were of the opinion that after the council has functioned for a while it will be both desirable and possible to get a further opinion from the attorney-general permitting it to initiate other projects affecting the relations of the oil industry with the federal Government.

Socony-Vacuum Terminal Opened in New Hampshire

PORTSMOUTH, N. H.—The arrival of the company's 16,046-ton tanker, Sachem, last week marked the completion of the new products terminal of Socony-Vacuum Oil Co., Inc., at Newington, N. H.

The vessel was the largest ocean-going tanker to enter the port here and the first to penetrate as far north on Piscataqua River, company officials said. The Sachem carried a 4,956,000-gal. cargo of kerosene, fuel oil, and diesel oil from the company's Beaumont refinery.

The new terminal, which replaces the installation at Portmouth where facilities do not permit docking of ships of the Sachem's size, comprises 12 tanks with a capacity of more than 16,500,000 gal. and is located north of Portsmouth about 7 miles up the river. Construction was begun in 1942, but all facilities, including dredging, were only recently completed.

California Standard Force Is 40 Per Cent Veterans

SAN FRANCISCO. — Veterans of the second World War constitute approximately 40 per cent of Standard Oil Co. of California's entire working force of nearly 25,000 persons, R. G. Follis, president, said recently.

Thus far 3,430 company employes who served in the military forces already have returned to work and approximately 6,500 others who were in the military services are now employed by the company. The latter constitute nearly 70 per cent of all new employes hired since V-J Day.

Scouts Directors to Meet

MIDLAND, Tex.—A meeting of the board of directors of the National Oil Scouts and Landmen's Association has been tentatively set for October 26 at the Adolphus Hotel in Dallas, according to S. S. Stinson, president. Business before the group includes selection of a date and place for the 1947 association convention.

Crude Supply Grows Tighter as Stocks Continue to Drop

BUREAU OF MINES figures showing a drop in crude stocks to their lowest point in 3 months gave some verification last week to reports of an extremely tight crude supply, particularly in some Texas areas.

The bureau report listed crude stocks September 14 as 221,903,000 bbl.—off 1,229,000 bbl. from the week-earlier inventories. In Texas, stocks showed a drop of 1,913,000 bbl. to a total of 102,931,000 bbl. Oklahoma was off 200,000 bbl. Foreign stocks were down 295,000 bbl. August 31 stocks were 227,132,000 bbl.

Marketers handling crude for weeks have reported crude, especially preferable sweet crude, difficult to obtain. Several weeks ago, some buyers were said to be offering premiums for certain East Texas material. One informed source said the situation "had the earmarks" of a possible upward swing in crude prices.

Little chance for an easier supply of crude in the immediate future appeared in prospect. The Texas Railroad Commission's October proration order calls for a reduction of more than 50,000 bbl. daily. At the statewide hearing earlier this month, several refiners, particularly Gulf Coast independents, told the commission they are running short of crude.

Some of those who regard petroleum stocks as a whole as excessive, concede that crude stocks alone are below the so-called economic levels. In the September 14 week, products stocks except gasoline continued their upward trend. Gasoline stocks showed a slight decline from 86,911,000 bbl. September 7 to 86,818,000 bbl. Kerosene stocks were up from 19,361,000 bbl. to 20,032,000 bbl.; gas oil and distillate fuel oil, from 54,721,000 bbl. to 56,204,000 bbl.; and residual fuel oil, from 54,786,000 to 55,736,000 bbl.

The rise in burning oil stocks, in the absence of colder weather increasing consumption, was a major factor in the relatively weak market in these products. Although storage was described as completely filled and the market still "sloppy," many dealers in petroleum products held to their conviction that heavy demand during the coming winter, equaling if not exceeding that of last winter, will require all available supplies. Most burning oils were in short supply in many sections last winter.

In the Mid-Continent area, No. 2 fuel oil was reported available for around 4 cents, and kerosene, for 4¾ cents last week. These prices are "under the market" by about ½ cent. Suppliers were awaiting the certain upturn to come with more favorable weather.

Mid-Continent motor fuel was described as "slightly weaker," although prices remained generally unchanged. Sizable export orders were reported to be bolstering the gasoline Gulf Coast market and indirectly aiding the market in the interior. One buyer said it appears that gasoline is being offered somewhat more freely, with prices to the consuming trade ranging up from 6¾ cents, Group 3 basis.

Fuel-Oil Situation

In regard to the fuel-oil situation, the bulletin of the National Association of Purchasing Agents said last week that the outlook for the coming heating season is considerably more favorable than in recent years, since all available storage is full.

"The over-all statistical position of the fuel-oil market has continued to show gradual improvement during recent weeks since the removal of price controls," it said. "Distillate stocks, including kerosene, are well above last year, and gasoline demand is falling below production. The residual-oil demand continues at extremely high levels, and, while suppliers are still unable to assume any sizable commitments from new customers, barring a long-drawn-out maritime tie-up due to labor strife, most of the regular civilian industrial consumers should be able to obtain their normal requirements, but anything over and above this is not too promising as residual fuel is still extremely tight, particularly at the Gulf and all along the Northeastern Seaboard."

In New York, the gasoline and fuel-oil situation was reported unchanged. Market observers there also were holding to predictions fuel oil of all types will be tight this winter.

From California came reports motor-fuel demand is persisting at an exceedingly high level, although vacation travel is declining.

New OPA regulations preventing use of other knock depressants to increase the knock rating of premium gasoline above the 78.5-octane standard has worked to the advantage of small refiners. No longer is it necessary for smaller suppliers to purchase expensive products for blending with premium gasoline in order to meet quality competition.

Rumors are current that exclusive-dealer contracts on Pacific Coast are under Justice Department scrutiny.

DEATHS

J. R. Munce, 79, vice president of Arkansas Natural Gas Corp., died September 14 in Pittsburgh. He had been active in the natural-gas industry since 1919 and had been president of the former Arkansas Natural Gas Co.

William Lyle Murrell, 55, independent oil operator, died September 15 at his home in Dallas. He was one of the original drillers of the Brownwood, Tex., field.

Earl H. Lindesmith, assistant purchasing agent for Shell Pipe Line Corp., died September 17 in Lisbon, Ohio. He had been with the company 15 years.

W. D. Harris, 75, retired independent oil operator, died September 20 in Norman, Okla. Prior to his retirement, he had been active in Oklahoma and Texas areas, including the Rio Grande Valley.

I. W. Drake, 38, independent oil operator, died September 20 in Houston.

Robert M. Briggs, 54, independent oil operator, died September 22 in Santa Fe, N. M. He had been active in the Ardmore, Okla., and Carthage, Tex., oil and gas areas.

Roy W. Estes, 24, salesman for Reed Roller Bit Co., was killed September 17 in an automobile accident near Falfurrias, Tex.

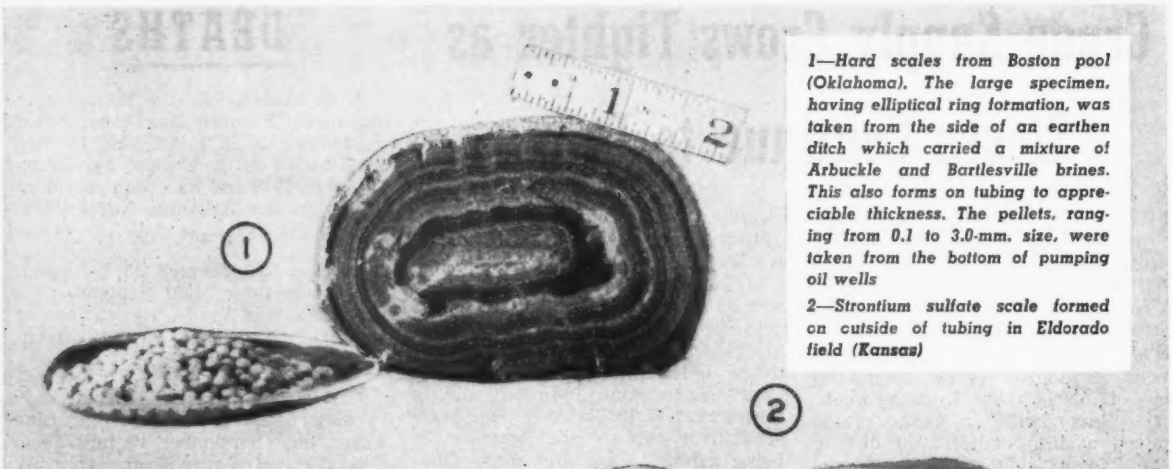
Seth G. Haring, 51, head bookkeeper of Gulf Oil Corp., died September 17 in San Antonio, Tex. He had been with the company 30 years.

Frank Bewley, 31, petroleum engineer of McCarthy Oil Co., was killed September 18 in an automobile accident near Beaumont, Tex. He had been with the company 7 years and had served 4½ years in the Army Corps of Engineers during the war.

Fred H. Hoffman, 97, retired superintendent of Carnegie Gas Co., died September 17 at his home in Pittsburgh. Prior to his retirement in 1931, he had been with the company more than 50 years and is credited with having constructed the first gas pipe line into Pittsburgh.

E. S. Rutherford, independent oil operator, died September 18 at his home in Houston.

A. L. Bowden, manager of the oil and gas division of H. K. Porter Co., Inc., died recently in Pittsburgh. He had been in the oil and gas industry as field representative of major companies since 1920 and was active in the opening of the Hugoton, Kans., gas field.



1—Hard scales from Boston pool (Oklahoma). The large specimen, having elliptical ring formation, was taken from the side of an earthen ditch which carried a mixture of Arbuckle and Bartlesville brines. This also forms on tubing to appreciable thickness. The pellets, ranging from 0.1 to 3.0-mm. size, were taken from the bottom of pumping oil wells

2—Strontium sulfate scale formed on outside of tubing in Eldorado field (Kansas)

Scales In Oil-Producing Equipment . . . . Their Occurrence and Causes

by L. C. Case

THIS article deals with an oil-production problem that can be troublesome both to the operator of flowing wells and to those concerned with strippers. To combat scales, a proper understanding of their occurrence and causes is first necessary. A following article will take up prevention and removal methods. The author, chief chemist for Gulf Oil Corp., Tulsa division, has had many years' experience in these matters and allied work on oil-field waters.

SCALE accumulation in oil-field equipment has always been a source of trouble and operating expense. No field or area is without its peculiar, recurrent scale problems and the search continues for some satisfactory or universal solution of these problems.

At the outset it should be stated that many practical and satisfactory solutions exist, but that a universal cure-all will never be found. In general, scale accumulations usually do not cause difficulties of appreciable magnitude, such as well shut down or major repair expense. Rather, scale troubles are commonly of minor nature, causing endless equipment cleaning or small part replacement, and general irritation of operating personnel. Annual operating expense due to scale formation is not comparable to that due to oil field corrosion. Costs due to scales are probably also considerably less than costs of treating emulsions or those of paraffin removal. Yet the scale problem is second to none in the number of salesmen and alleged remedies which it produces. Quite commonly, compounds offered for sale as preventives or remedies have considerable merit if properly used. Usually, however, such compounds contain much inert ingredient and are thus quite high in price. Furthermore, these compounds or mixtures, with directions for use, constitute at best only a partial solution. They do not ordinarily provide any fundamental understanding of the origin of the scale growth or its effective prevention.

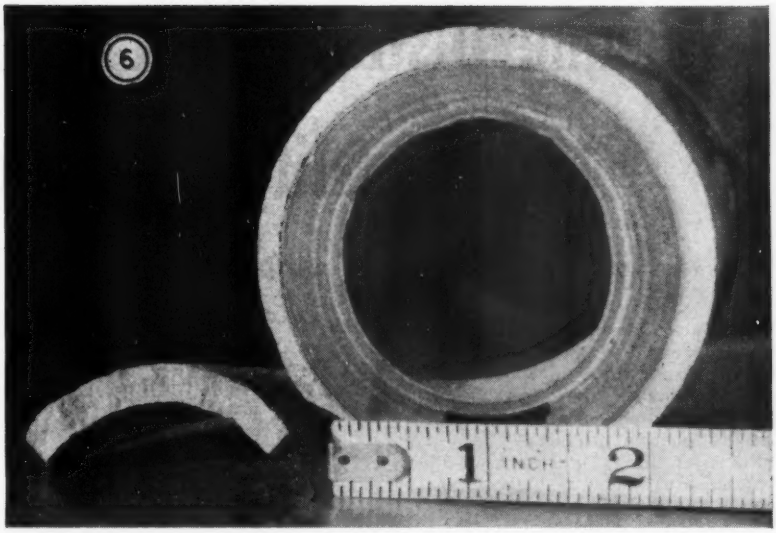
Preliminary Inspection May Lead to Practical Solution

Preliminary inspection of a scale deposit will usually reveal its gen-

eral constitution, which in turn will indicate its origin. In a great many cases, preventive measures are quite simple and inexpensive. Logically, prevention is to be preferred since correction of conditions resulting in scale formation entails only a first cost. Chemical methods for prevention or removal are justified only if the accumulation of scale is otherwise unavoidable, and the chemical methods cost less than maintenance without their use.

Various types of scales occur in different parts of field equipment which handle water. Formation of these scales is due to a variety of causes which may be present in water ranging from fresh to quite salty in nature. In general, scale formation should be considered as a chemical precipitate resulting from two main causes, (1) supersaturation, (2) the mingling of two unlike waters having incompatible compounds in solution.

There is usually nothing difficult about the identification of a scale deposit, as will be shown later. A few simple tests will serve to establish the major constituents. It should be understood that some of the solid substances found in scales may result from either one of the two main causes or they may be due to a combination of these physical and chemical conditions. Certain scale components can be due only to one definite mode of origin. Thus, identification of the main constituents in a scale may point immediately to its origin and a practical method of prevention.



6—Scale growth in cement-lined waste-water line, Centralia, Ill. Steel pipe has been removed. Outermost light ring is cement lining. Inner rings are composed of calcium carbonate and iron sulfide

3—Gypsum deposit, Smith Mills pool, Kentucky. Section of gas anchor which has become almost completely closed by precipitation of gypsum from brine of the Cypress sand

4—Calcium carbonate scale from tubing and lead lines, Hobb, N. M. The thick scale, left, formed in a lead line during only 120 days of operation

5—Two-inch tubing from flowing wells in Hobbs pool, New Mexico, after 5 months' operation. Tests showed 3,200 lb. of the $CaCO_3$ scale in this tubing string

Following partial analysis and identification, attendant conditions should be checked to prove or disprove the assumptions made on the basis of the scale examination. If these conditions are exactly in accordance with those indicated by the analysis, then one may confidently draw final conclusions and proceed with selected preventive or remedial measures.

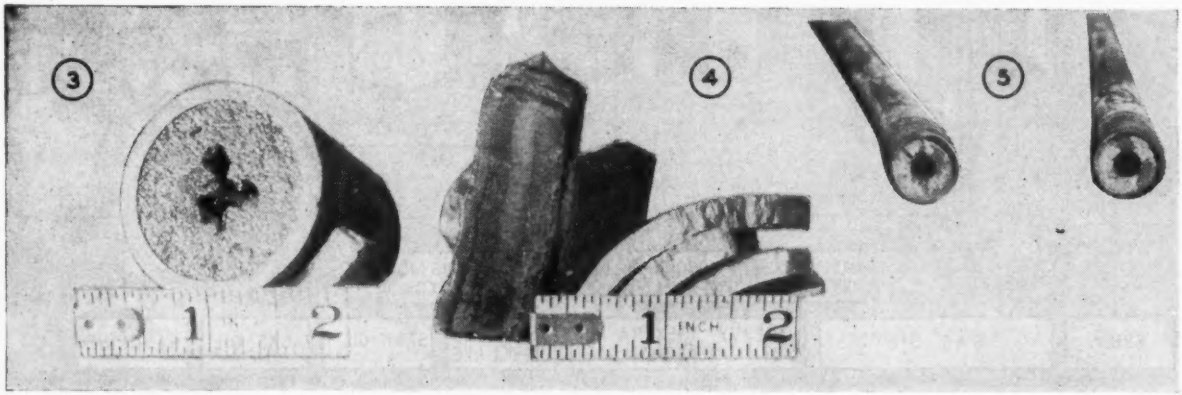
Scales Classified According to Physical Appearance and Causes

The composition of scales is as variable as the nature of the waters which produce them. The deposits which occur from oil field brines or mixtures of brines are relatively simple in comparison to those from boilers and cooling systems.

Scale deposits found in pumping or flowing oil wells, lead lines, tanks, waste salt water systems and possibly water flooding systems appear to have a definite similarity in origin and make-up which permits a certain amount of classification. This classification, appearing in Table 1, is intended to serve as a generalization to aid in field tests and identification. Before the identification may be made on the basis of the major constituents found, it is necessary to have a clear idea as to the usual types encountered in the oil fields and the most common occurrence and reason for these deposits. Usually the oil field scales may be classed chemically as either sulfate or carbonate type. Mixtures of these occur as well as mixtures of carbonate and sulfate with iron sulfide, iron oxides, free sulfur, etc.

The two main classes are quite different in chemical and physical nature and have a separate and distinct basis for formation. There are a few exceptions to these general rules as to origin but the exceptions are not confusing when the relatively simple chemical relationships are understood and taken into consideration. Table 1 presents a summary of scale deposits which will serve as a guide to the field determination of most scales and their method of formation. Ref-

(Continued on page 101)



Vacuum Distillation, Chemical Treating Make Quality Lubricating Oils

by Arch L. Foster

Manufacture of five grades of lubricating-oil fractions of especially low Conradson carbon residue and pour points is carried out in two major stages by Sinclair Refining Co. Preparation of the raw fractions by a final vacuum distillation step, followed by acid treatment, soda ash neutralization, and clay filtration operations comprise the refining process described in this article. The stock is from a South Texas crude high in lubricating-oil components.

FOR various types of lubricating oils the peculiar properties of certain South Texas crudes make the lubricant fraction of those crudes especially advantageous for conversion into lubricating products. The applications of those lubricants centers around uses wherein high viscosity index is not desirable or not necessary, whereas low pour points and low Conradson carbon residue values are of paramount importance. Starting with this type of crudes as source material for making this type of lubricating oil, Sinclair Refining Co. at its Houston refinery has developed a process for producing these oils which appears to be unique in refining methods for crudes of relatively low paraffinicity.

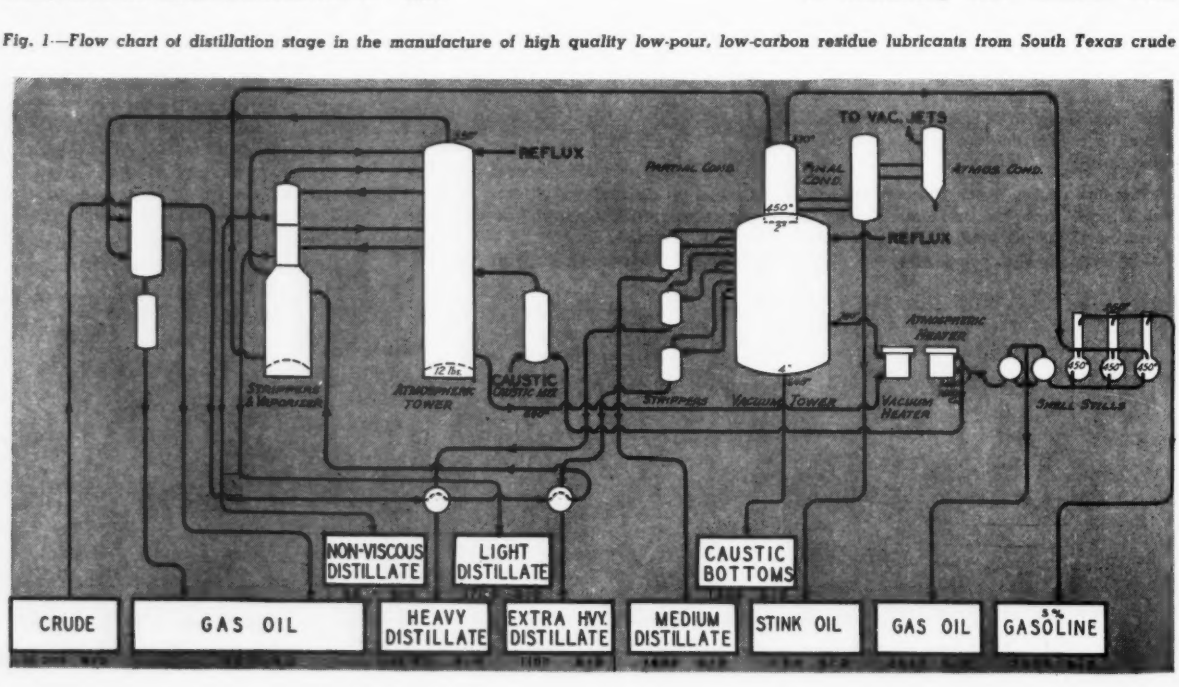
The process is a two-step program, built around a vacuum distillation to segregate the fractions, followed by an acid-and-caustic treatment to purify the raw products. Advantage is taken of every method for conserving heat and raw material and to maintain control over process and thus over product quality.

The main items in the ensemble of the unit are a battery of five shell stills, three for initial fractionation of the incoming crude to remove the small amount of gasoline present, and two for stripping light virgin gas oil from the crude processed; two heaters, one vaporizer-stripper and an atmospheric and vacuum fractionator, along with caustic neutralizing facilities and other auxiliary items. These are arranged in a compact, self-contained unit, minimizing the work required to operate and control the unit.

The operations for production of lubricating oils from South Texas crude are outlined in the flow charts shown in Figs. 1 and 2. In Fig. 1 a charge of 15,000 bbl. per day of crude is introduced into the unit.

The crude charge is picked up by a steam-driven pump, 16 by 8¼ by 18 in., and first exchanges heat with the outgoing stream of the gas oil from the atmospheric column overhead. It is transferred then to exchange heat in a succession with the heavy and extra-heavy distillate streams, is passed through the vaporizer and goes to the partial condenser atop the vacuum tower where it "knocks back" some of the gas-oil vapors starting overhead. These successive exchanges raise the charge temperature to about 320° F., and at this temperature it enters the battery of three crude shell stills, in parallel. Raising its temperature here to 450° F. at atmospheric pressure takes off about 5 per cent (750 bbl. per day) of gasoline at an overhead column temperature of about 250° F. This gasoline combines with other straightrun gasoline from other plant units and has no part in the making of lubricating oils. Bottoms from

Fig. 1—Flow chart of distillation stage in the manufacture of high quality low-pour, low-carbon residue lubricants from South Texas crude



these shell stills combine and pass to a pair of shell stills in series, overhead from which a combined stream of 2,525 bbl. per day of gas oil is taken.

Bottoms from the second of these stills is the lubricating-oil fraction or residuum. It passes at about 540° F. to the atmospheric heater where its temperature is raised to about 760° F. and is sent to the caustic mixing tower. Here it is mixed with 20° Be. caustic soda solution in water, equivalent to 0.35 lb. of caustic per barrel, and goes immediately to the atmospheric flash-fractionator and is flashed at 700° F. About 12 psig. pressure is maintained on the bottom of this tower, and about 9 psig. pressure at the top. The overhead vapor stream, at about 530° F., exchanges heat with incoming crude, is condensed and may be combined with the first gas-oil stream, or may be held in separate storage as desired. One use for these gas-oil streams is for catalytic cracking unit or thermal cracking unit charge; another is of course to be sold as distillate fuel oil, furnace oil, and similar products. The caustic used in this distillation step is so adjusted as to maintain a maximum of 0.05 acid number for all distilled streams.

Side streams from the atmospheric tower, two in number, are stripped in separate stripping columns, set one above the other atop the vaporizer column mentioned above. Vapors from the top of each stripper, and also from the top of the vaporizer, are returned to the atmospheric tower, and the two stripped fractions become the raw nonviscous distillate and light (lubricating oil) distillate, respectively. The light distillate stream normally yields approximately 1,700 bbl. per day of the raw distillate.

Heavy residuum from the bottom of the atmospheric tower is taken to the vacuum unit heater, temperature raised to 750° F. and discharged into the vacuum tower to flash at about 715° F. This tower is maintained at a pressure of 2 in. of mercury absolute at the top and about 4 in. absolute at the tower bottom. The overhead temperature is maintained at around 450° F. The partial condenser on the overhead from this tower is cooled by the incoming crude charge as outlined above. From an intermediate condenser about 5 per cent of the crude, or 750 bbl. per day, of an intermediate fraction, called by the operators "stink oil," is withdrawn. Noncondensable vapors are led to a barometric condenser and then to vacuum jets to maintain the vacuum on the system.

From the side of this vacuum tower three cuts are drawn. This tower contains eight bubble trays, two trays between each drawoff. These separate

(Continued on page 97)

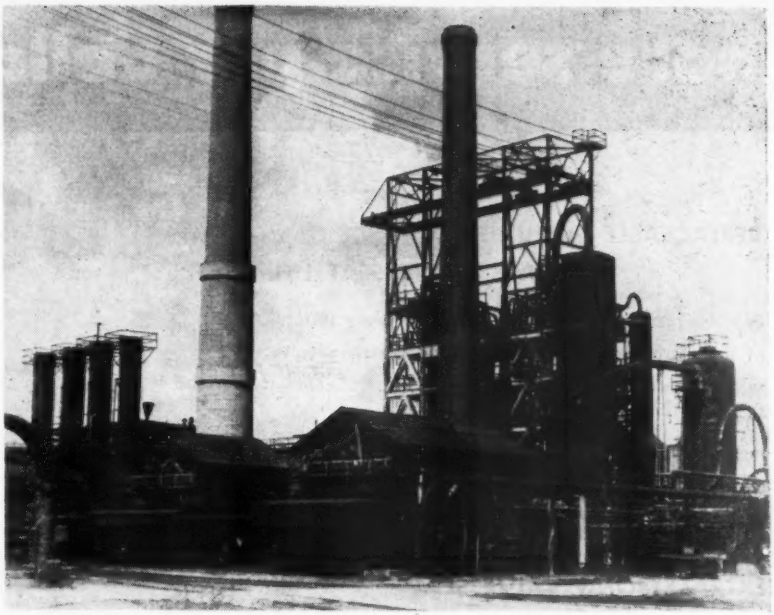


Fig. 3—View of the special distillation unit operating on South Texas crudes to prepare raw lubricating oil fractions for further refining operations in Sinclair Refining Co.'s Houston refinery

TABLE 1—TESTS—SOUTH TEXAS LUBE DISTILLATE AND FINISHED OIL, SINCLAIR REFINING CO., HOUSTON

Distillates:	55-60	100	300	1,200	Dilution
Flash	255	310	385	460	315
Viscosity	55/100	104/100	310/100	80/210	260/100
Acid treatment:					
Lb. acid/bbl. oil	10	15	25	30	40
Neutralization:					
Lb. soda ash/bbl. oil	1	1.5	2.0	2.5	3.0
Finished fractions:	55-60 Pale	100 Pale	300 Pale	1200 Pale	2000 Pale
Flash	280	310	370	445	475
Viscosity	56/100	100/100	300/100	72/210	100/210
Color	1½+	1½+	2+	3+	3½—
Pour, °F.	—65	—45	—25	—5	20
Acid No.	0.03	0.03	0.03	0.03	0.03
Con. carb. res.	0.01	0.03	0.04	0.08	0.28

Note: 200, 500 and 750 distillates are not taken directly from the crude still, but are blended from the above distillates before treating

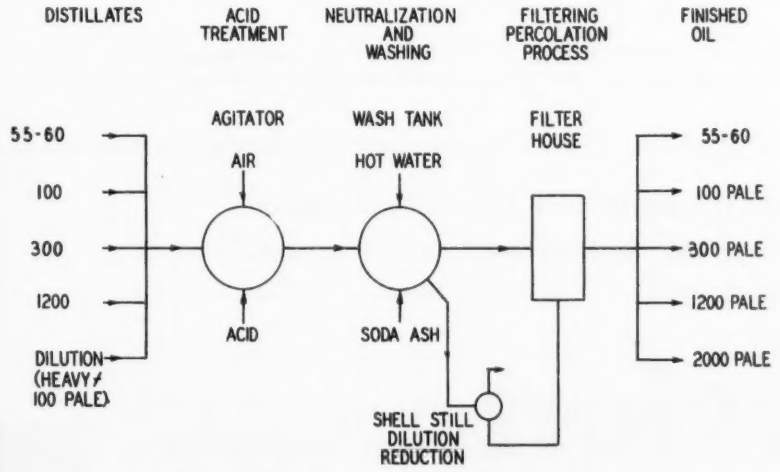


Fig. 2—Acid treatment, neutralization, and clay filtration complete the refining of the lubricating oil fractions as outlined in this flow chart

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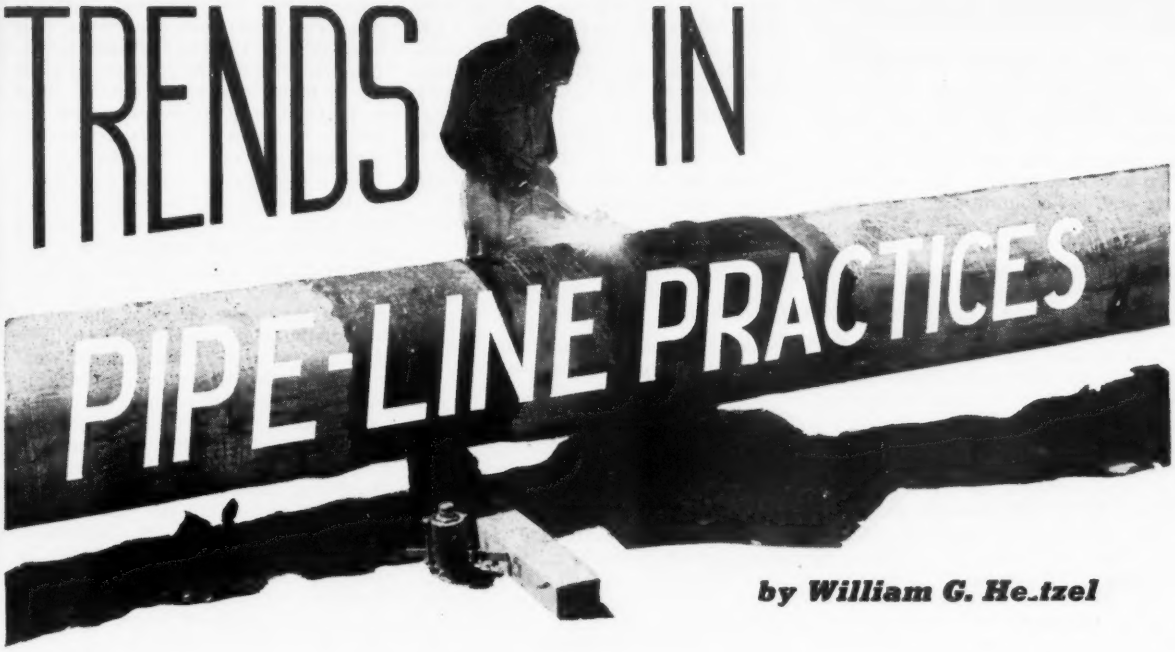
TRENDS IN PIPE-LINE PRACTICES



by William G. Heltzel

A PROVIDENT and efficient use of steel for pipe lines is a modern-day practice and as a result important economies are being realized by the industry. The reserve of high-grade iron ore within the United States has diminished to the point where it must be conserved through an efficient use of steel. Also the economic limitations under which pipe lines operate now dictate the efficient use of steel in pipe lines. The pipe-line engineer is able to aid in this respect through the use of higher-tensile steel, greater working stresses, and less wall thickness in pipe. The details of this subject may be found in the aforementioned article by the author. Suffice it to say here that it is considered good practice to use a working stress equivalent to about one-half of the yield and that the trend to less wall thickness continues. The influence of old established practices often causes a lagging effect in the adoption of new and modern practices, and old practices carry over as a vestige beyond the time that they become outmoded.

A few pipe-line companies may still hold to the theory that greater wall thickness is justified as a means of withstanding the corrosion of underground lines, but this notion is being discarded and it is becoming a general practice to use pipe having less wall thickness and to apply a protective coating. The adoption of less wall thickness must be done with conservative judgment, giving due weight to the practical considerations, which place a limit on the weight of pipe that can be used.

By the very nature of cross-country pipe lines many bends must be made. Usually these bends are made without heating, by straining it in a machine beyond the elastic limit; without sufficient wall thickness the pipe may buckle. Therefore, bendability is an important consideration in reducing wall thickness. Without sufficient wall thickness distortion in straightness and roundness may occur in the handling of the pipe from the time it leaves the mill until it is laid in a line. For pipe lines in which internal corrosion is anticipated greater wall thickness may be justified. For the purpose of emphasis, the author wishes to repeat the admonition that due weight must be given to these practical limitations when considering a reduction in wall thickness with respect to pressure requirements.

This advice leads to the question: "What are practical limitations with respect to wall thickness for the various diameters of pipe?" Based on the author's own information and experience it is his opinion that 7/32-in. wall can be used for 8 and 10-in. and probably less wall for 6-in. Possibly 7/32-in. can be used for 12-in. but the author has had no experience in this weight for 12-in. to warrant an opinion other than the possibility of it. For 12 and 16-in., ¼-in. wall has been used satisfactorily in seamless and electrically welded higher-tensile-strength pipe. It may prove satisfactory for 18-in. For 20 and 22-in. a minimum wall of not less than 5/16-in. is recommended; experience may show that this minimum wall thickness can be reduced further. Without sufficient experience in the largest diameters, the author cannot offer an opinion on the 24 and 26 in. It is believed that the pipe-line and steel industry should make some joint tests to determine the minimum wall thickness for bendability of various diameters of pipe.

Pipe - wall thickness, higher operating pressures, pumping equipment, and diesel engines are discussed here. In a previous article appearing on page 182 of the September 21, 1946, issue the author dealt with coal-gas transmission, problems of serving new fields, and the advantages of large-diameter pipe lines.

The trend toward the use of less wall thickness is reflected in the quantities of the various sizes of pipe (having reduced walls) that have been used in some lines in recent years. In a 385-mile 16-in. line laid in the last part of 1944 and the first part of 1945, 355 miles were constructed of ¼-in. wall pipe. In a 232-mile 12-in., laid in 1944, approximately 94 miles were ¼-in. wall. Approximately 112 miles of 7/32-in. wall pipe were used in 148 miles of a 10-in. line laid in 1945. In a 72-mile line of 8-in. laid in 1945, 40 miles of it were constructed of ¼-in. wall and the remaining 32 miles were built of pipe having a wall of 7/32 in. In each of the cases where only the minimum wall is referred to, the remaining sections of the line were

constructed of pipe having a heavier wall.

Use of Tapering Weights

As a sequel to thinner walls and larger diameters, the use of various weights of pipe in a section of line, tapering in wall thickness from the high pressure point to the low pressure end, is becoming a general practice of the industry. Of course in mountainous terrain the weight of pipe that can be used is determined for any segment of the line by the hydraulic gradient. The principle of tapering weights is applicable primarily to lines that will operate with the flow in only one direction. In case the flow in a line of tapered weights is reversed, the capacity of the line pumping from the low pressure end would be reduced, due to the lower pressure that could be used for pumping in the opposite direction.

The principle of tapering weights is particularly useful and economical in designs employing higher pressures and larger diameters, because greater quantities of steel are involved. Obviously greater care must be exercised in laying out a high-pressure or large-diameter system to make sure that no more than enough wall thickness is provided for the successive segments of the line to meet the pressure of the hydraulic gradient. Meticulous supervision is required to make sure that the various weights of pipe are marked; and that it is delivered to and laid in the proper place in the line; but this tedium is justified by the economies that can be realized. The number of different weights that can be used in a line is determined by the diameter, length of line between relay stations, plans for intermediate pumping stations, operating pressures, and the minimum permissible weight.

In the smaller lines, 10 in. and less in diameter, only one or two weights can be justified, because in these diameters the minimum practical wall thickness is adequate, or nearly so, for meeting the higher pressures that might be used. Although some of the following information offered to show the trend in the use of tapering weights was given in a previous paper (The Oil and Gas Journal, September 23 and 30, 1944) some of it will be repeated here for the convenience of the reader. A 16-in. line built in 1944 for 750 lb. pressure (two pumping stations) was composed of 355 miles of 0.25-in. wall and only 30 miles of 0.284-in. wall, representing two 15-mile sections laid out from the two pumping stations. In 232 miles of 12-in., built in 1944, for 1,400 lb. pressure, using two relay stations, four different weights of pipe were used: a small amount of 0.50-in. wall for river crossings, 84 miles of 0.375-in. on the high-pressure end and for the deep valleys of the mountainous terrain, 54 miles of 0.3125-in. wall, and 94 miles of 0.25-in. wall. A 10-in. line (148 miles long) built for 1,500 psi. contained four weights: 8 miles, 0.344-in.; 13 miles, 0.307-in.; 12 miles, 0.279-in.; and 115 miles of 0.219-in. wall. An 8-in. line (72 miles long) built in 1945 for 1,400 psi. operating pressure consisted of 32 miles of 0.281-in. wall and 40 miles of 0.250-in. wall. These figures mean substantial economies in tonnage of steel and in overall costs compared with the outmoded practice of using a single weight of pipe throughout the length of a line.

Fewer Pumping Stations and Longer Pumping Distances

Foresighted designs for pipe lines that can survive competition will provide also for fewer pumping stations, longer pumping distances, and higher operating pressures than have been and still are being used today. Instead of the outmoded pumping distances of 37 to 50 miles, the distances between relay pumping stations will be 75 to 100 miles. Doubling the pumping distances means halving the number of pumping stations. It is more economical to invest in larger-diameter pipe and in higher-pressure equipment than in smaller-diameter pipe and a greater number of moderate-pressure pumping stations. It is advisable to invest in larger-diameter pipe especially when the volume of traffic for a line is definitely known or fixed, to obtain moderate pressures, because it is not economical on a permanent basis to obtain capacity by increasing velocity at a penalty in power with an inordinately small increase in capacity. But any person experienced in pipe lining knows that due to the risk of the business ordinarily little or no leeway is provided for in the design of pipe lines to take care of unforeseen growth in the business that places a constant burden on the capacity of pipe lines.

At this point something should be said about pressures that may be used to a greater extent. It is the author's opinion that new pipe lines should be designed with sufficient reserve strength to permit operating pressures of 1,000 to 1,200 lb. for use when needed. In some cases, depending on the size of the line and other conditions, designing for a maximum pressure of 1,500 psi. may be justified. By this is meant that the pipe line, discharge station piping, and pumps should be designed for 1,000 to 1,200 psi. normal operating pressures, even for 1,500 psi. when the conditions warrant such a pressure. The latter would apply in the case of lines 12 in. in diameter or smaller, which would require only an incremental investment in higher-pressure equipment. Incidentally, it is the author's opinion that the modern high-pressure pumping equipment, when installed, will cost no more than the conventional low pressure installations. For continuous operations, it is believed that 1,000 to 1,200 psi. is reasonable. The higher pressure of 1,500 psi. is mentioned as an outside limit to be used only for a temporary situation and where conditions permit and warrant such a pressure.

As a matter of safety and practicability pressures exceeding those that have been discussed above are not recommended. Although the applications of higher pressures have been listed in a previous paper, inquiries that have come to the attention of the writer lead him to believe that the interest in this subject warrants further mention concerning some of these applications. Most pipe liners know about the difficulties that were experienced for years in pumping the viscous black oils of Wyoming, especially during the winter months; heating the oil was not only expensive but also ineffective. Today these oils are handled daily through the winter months, without any heat; it has been accomplished through the use of larger-diameter pipe and higher pressures.

Another interesting example is the case of one pumping station pumping a distance of 100 miles against a static head of 1,080 lb., due to a rise of about 3,000 ft. of elevation in the first 50 miles. The operating pressure of the station has varied from 1,300 to 1,550 psi. If an intermediate station had been used for dividing the load, it would have been necessary to have located it on the flank of a mountain range where it would have been inaccessible during the winter months. On this same line, after reaching the plateau where there were no large changes in elevation, higher pumping pressures were used to provide for maximum pumping distances and a minimum number of pumping stations. High pressures have proved most useful in maintaining line capacity on a system that has been called upon to handle crude oils having a wide range of viscosities.

The principle of high pressures can be used to very good advantage in carrying temporary peak loads which occur on a trunk-line system or for handling temporarily greater quantities of oil than had been anticipated from new oil fields. High pressures can be justified for handling new traffic, until it is known that the new business is permanent and that additional large investments in lines are justified. It is important to remember in planning for higher pressures that the risk of failures in the pumps and in the piping increases with the pressure and therefore the designs must provide for suitable materials and proper equipment. High-pressure piping should be used on all of the station discharge piping, including the manifold.

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valves and flanges should be specified depending on the pressure. Of course, a suitable weight in the fittings and in the pipe should be specified. The joints in the discharge piping and in the pump are of special importance. A grooved joint, using either tongue and groove or a ring-joint gasket, is recommended. The pumps should have forged steel cylinders with as few high-pressure joints as possible. Adequate strength must be provided in the mechanism of the pump to meet the maximum operating pressures, allowing a suitable factor of safety. This does not mean that such a pump must be tailor made; suitable pumping equipment is on the market. For moderate or high pressures a firewall between the engine (or motor) and pump room is a good safety precaution.

Pumping Equipment

An important change may be occurring in the type of reciprocating machinery that will be used in the future as pumping equipment for crude-oil pipe lines. The goal is a direct connection between the prime mover and the pump, running at the same speed, crankshaft to crankshaft, thereby eliminating the intermediate train of gears in the pump. This means that the speed of pumps may be increased from the conventional 40-60 r.p.m. to 160-400 r.p.m. Already some installations for speeds of 160 to 200 r.p.m. have proved successful. The higher speeds require shorter strokes and multiple cylinders. Logically this equipment will be designed for pressures up to 2,000 lb. Pressure lubrication will be used on all parts of these higher speed pumps. The elimination of the gears in the pump provides for simplicity, compactness, lower maintenance, and higher mechanical efficiency.

An installation, consisting of a 400-r.p.m. diesel engine and a 400-r.p.m. quintuplex 4 by 3-in. pump (1,500 psi.) was made on a pipe-line system late in 1945. Unforeseen problems experienced in this installation have resulted in a revised design which has promise of being an outstanding development in pumping equipment. The aim of this type of pumping equipment is to obtain power and pumping capacity in as compact a unit as possible thereby effecting economies in foundations, floor space, and in the costs related to weight; to provide a wide range of flexibility in capacities by having a wide limit of speeds and pressure; to reduce the first cost for reciprocating equipment; and to improve the portability.

The use of high speed pumps involves proper filling and more noise and vibration in the discharge piping than is experienced in the conventional type equipment. Ordinarily, pressure is carried on the suction system, when diesel engines are used, to overcome the friction loss in the heat exchangers and it is believed that the filling of the pumps will not be a serious problem, except possibly at the highest speed. For speeds up to 200 r.p.m. proper filling may be obtained with normal suction pressures. Vibration and noise require that special consideration be given to the discharge piping. Unfortunately, too little is known within the industry about surges and vibration in the discharge piping systems to enable the pipe-line engineer to design these systems on a rational basis.

The diesel engine will probably continue to be the principal source of power for crude-oil pipe lines; however, the advantage of diesel power over electrical power has been narrowed by the increased investment, by higher labor and fuel costs, and by the difficulty of operating diesel engines, using sour crude as fuel. The diesel engine retains the advantage of flexibility of operation, due to the inherent power-speed range.

New Speed Specifications

Because of the low thermal efficiency of the gas turbine at its present stage of development an early use for this type of prime mover for pipe-line pumping stations cannot be foreseen now. Specifications for new diesel engines call for speeds up to 450 r.p.m.; above this speed crude oil cannot be used satisfactorily as fuel. Probably four-cycle solid-injection-type engines will be preferred because air injection is more or less obsolete and because the four-cycle engine can be supercharged. Incidentally supercharging has proved satisfactory. The installations made a few years ago on old-style engines have an excellent record; after the development period the turbocharges and the engines have performed reliably and practically free of trouble. No abnormal maintenance cost has been observed. A gain of at least 40 per cent in horsepower has been obtained. The turbocharges will probably be used as a means for increasing the power output of new and old engines. Through the high thermal efficiency, by increased speeds and supercharging, and probably through improved combustion, the manufacturers hope to maintain their lead over other prime movers.

These same principles are worthy of consideration by pipe-line engineers in planning for the modernization of installed equipment that is suitable and adaptable to such changes. It may be of sufficient interest to mention the possibility of highly concentrated hydrogen peroxide which is being investigated as a means of improving the efficiency of and as a method for increasing the output of diesel engines; although somewhat conjectural, it is believed to have good possibilities. Recent scientific news releases indicate favorable opinions of experts who have had an opportunity to study the wartime use of hydrogen-peroxide energy by the Germans in compact submarine turbines, torpedoes, V-2 bombs, and piloted rocket aircraft. It is reported that the Germans used a very small steam turbine in their submarines that developed 7,500 hp., using energy that was obtained from hydrogen peroxide plus diesel fuel with steam as a medium for conveying the power. Such a turbine might become a very useful source of power for pipe-line pumping stations.

The centrifugal pump, motor or engine driven, is used generally for products pipe lines, for which it is particularly suitable, and it is being used extensively for crude-oil pipe lines. The reciprocating pump has considerable leeway over the centrifugal pump with respect to the efficiency; it is more suitable for pumping crude oils having a wide range of viscosities; and it provides for greater flexibility of operations. The centrifugal pump has the advantage of a lower first cost. A general rule cannot be used for choosing pumping equipment. A study, including both economical and operating conditions, should be made for each case. Such a study should anticipate in so far as possible long-range conditions.

River Crossings and Protective Coatings

Because these two subjects are of particular interest to pipe lines mere mention of these subjects is made for the purpose of referring any reader that might be interested to the author's article in The Oil and Gas Journal, September 30, 1944. After a review of these subjects as presented at that time, the writer finds that there have been no important developments in the past 2 years to warrant any further discussion.

BOOKS

OIL AND PETROLEUM YEARBOOK. 1946. Compiled by Walter E. Skinner. 20 Copthall Avenue, London E. C. 2. 200 pp. 16s.Od. net.

The current edition, the thirty-seventh year of issue of this standard reference work, gives complete and up-to-date particulars concerning 566 companies covering all branches of the industry. Data presented, on both American and foreign companies, comprise names of directors and other officials, seat of operations, description of business, crude-oil production, details of capital, dividends, and financial results. Other useful features are names and addresses o. 260 managers and engineers and the names of the companies in the book with which they are connected, and a buyers' guide of manufacturers of oilfield and refinery equipment, comprising 400 headings.

CAPPED: 65,000,000 Cu. Ft. Well LOOSE at Surface Hole

THIS article describes how it was possible to avert a potentially dangerous blowout in a California well through cooperation and coordination of effort by the operator and equipment engineers. Russell E. Havenstrite, operator, was in charge of the well and directed all corrective measures. Homer Havenstrite, general superintendent and Ed McWherter, superintendent at Del Valle, assisted in directing the work. Glenn D. Johnson, chief engineer, Baash-Ross Tool Co., Los Angeles, acted in advisory capacity and designed and constructed the equipment used to correct the trouble.

SYNCHRONIZATION of conception, design and installation of special equipment recently provided a happy and successful answer to an emergency in a California oil-field operation which threatened loss of an expensive well. Furthermore, the trouble, had it not been for prompt and effective corrective measures, might have caused irreparable damage to the reservoir and inestimable loss of surface property.

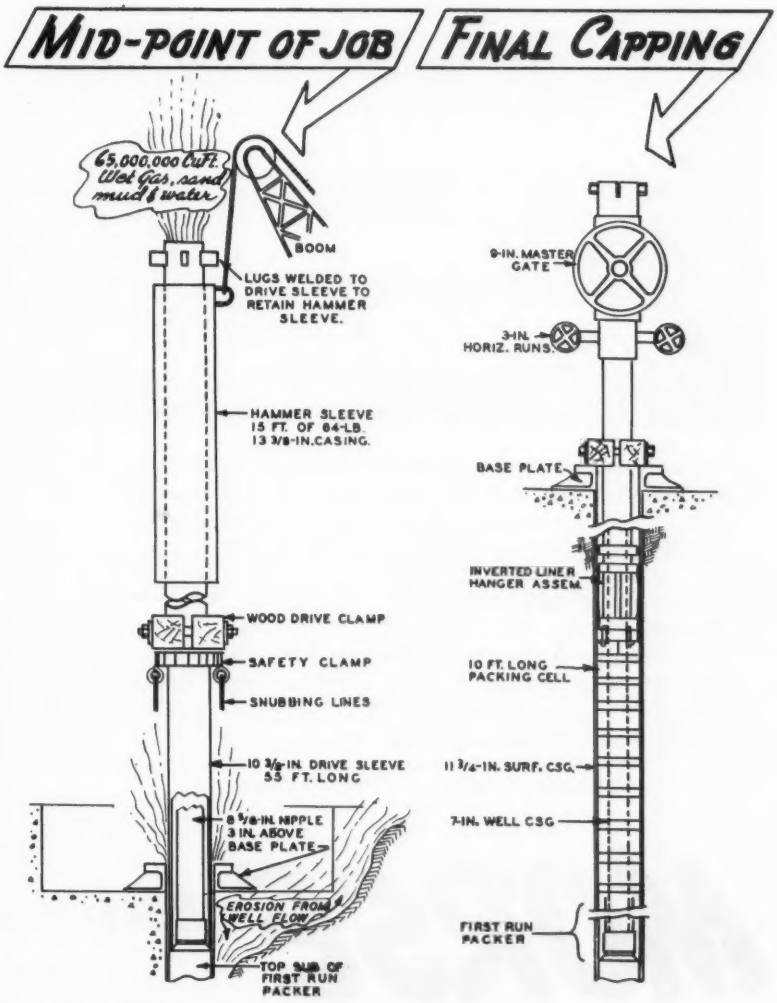
The trouble, requiring the coordinated engineering skill of operators and manufacturers in designing special equipment to cope with emergency conditions, developed in R. E. Havenstrate, operator, 7 Barnes, in the Newhall field, Ventura County, about 30 miles north of Los Angeles.

Exceedingly high pressure developed in the annulus between the 11¾-in. surface pipe and the 7-in. oil string, culminating in failure of the surface connections. Failure started with a leak in the weld securing the base unit to the surface casing and, in a short time, the flow of gas, sand, mud, and water cut out the side of the base unit and then cut out the christmas tree and suspension parts supporting the 7-in. casing at the ground level. Remaining portion of the christmas tree was removed from the well by the operating crew and all surface fittings were stripped down to the base plate.

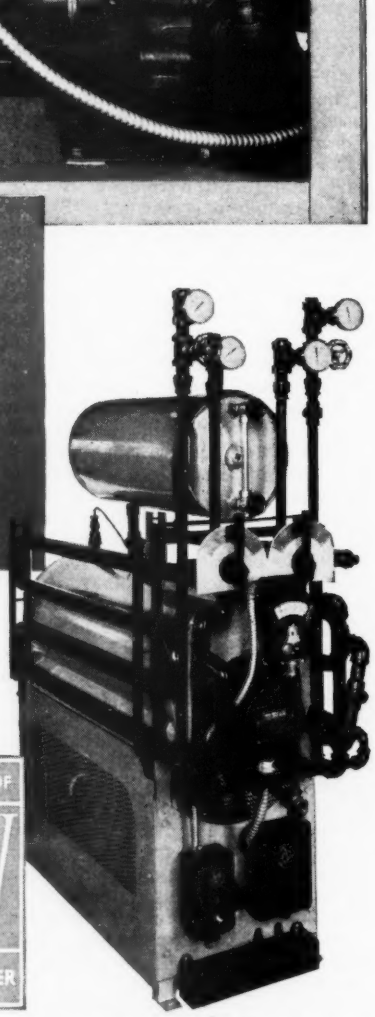
Decision was reached to use a packer constructed in the form of an inverted liner hanger of such size that it could be passed down around the 7-in. oil string and inside the 11¾-in. surface pipe. Thus, it was hoped, the 11¾-in. casing could be sealed in and the pressure equalized in the annulus.

Engineers further concluded that an 8⅝-in. nipple was to be screwed in the upper end of the inverted liner hanger and was to receive a 9-in. 6,000-lb. test gate valve at its upper end. Two 3-in. horizontal runs were to be arranged immediately below the 9-in. gate valve to serve as communication ports to the well when the valve was closed. The 8⅝-in. nipple for spacing the gate valve above the inverted liner hanger was approxi-

(Continued on page 99)


MID-POINT OF JOB
FINAL CAPPING
65,000,000 Cu.Ft. Wet Gas, sand, mud & water
BOOM
LUGS WELDED TO DRIVE SLEEVE TO RETAIN HAMMER SLEEVE.
HAMMER SLEEVE 15 FT. OF 84-LB. 13 3/8-IN. CASING.
WOOD DRIVE CLAMP
SAFETY CLAMP
SNUBBING LINES
10 3/4-IN. DRIVE SLEEVE 55 FT. LONG
8 5/8-IN. NIPPLE 3 IN. ABOVE BASE PLATE
EROSION FROM WELL FLOW
TOP SUB OF FIRST RUN PACKER
9-IN. MASTER GATE
3-IN. HORIZ. RUNS
BASE PLATE
INVERTED LINER HANGER ASSEM.
10 FT. LONG PACKING CELL
11 3/4-IN. SURF. CSG.
7-IN. WELL CSG.
FIRST RUN PACKER

Modern Machines Deserve MORFLEX Couplings



John Royle & Sons, manufacturers of extrusion equipment, use Morflex couplings in the power drives of their temperature control units, which handle extruding temperatures of 90° to 500°.

Morflex couplings require no lubrication, are unaffected by gas, oil, dirt or weather. The exclusive Morse-designed Neoprene biscuit cushions shock, isolates vibration and uneven impulses, *prolonging machinery life.* MORSE CHAIN COMPANY—Ithaca, N.Y.—Detroit 8, Mich.

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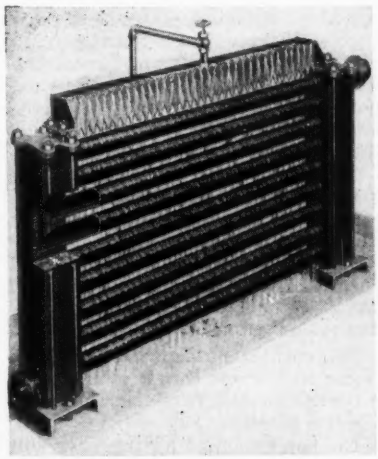
PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Impervious Graphite Exchangers and Coolers

GRAPHITE is unusually resistant to corrosive substances, resisting the action of most acids, alkalies, and other chemicals, which are not highly oxidizing in their behavior. An impregnated form has been successfully developed by National Carbon Co., Inc., and marketed under the trademark Karbate. This material can be shaped into pipe, tubes, plates, tube sheets, blocks, bends, etc. Some of the Karbate equipment has been standardized so that it can now be ordered from stock. This equipment includes a sectional cascade cooler, plate-type heaters, seven-tube shell and tube exchanger, equipment and connections, pumps, valves, etc. By using a high-strength special cement to join the sections of impervious graphite parts, complete freedom from the corrosive action of most chemicals can be obtained. Operating temperatures up to 338° F. and pressures up to 75 psig. hydrostatic pressure can be handled in standard equipment. Table 1 shows a partial list of the resistance of Karbate stock to chemicals in varying concentrations and at different temperature ranges.

Graphite differs greatly from ordinary carbon in its ability to conduct heat, as indicated in Table 2, being higher in this respect than many metals.



Karbate sectional Cascade cooler

TABLE 1—KARBATE STOCK—CORROSION RESISTANCE

(Satisfactory Uses of Karbate Materials Is not Limited to the Chemical Reagents Shown in This Table)

Chemical reagent—	Concentrations up to	Temp. up to
Acids:		
Carbonic acid	Saturated	Boiling
Hydrochloric acid	All	Boiling
Hydrofluoric acid	48%	Boiling
Hydrofluoric acid	48-60%	185° F.
Hydrofluoric acid	Over 60%	
Hydrogen sulfide-water	Saturated	Boiling
Sulfuric acid	25%	Boiling
Sulfuric acid	25-75%	275° F.
Sulfuric acid	75-96%	176° F.
Sulfuric acid	Over 96%	
Alkalies:		
Ammonium hydroxide	All	Boiling
Monoethanolamine	All	Boiling
Sodium hydroxide	10%	131° F.
Sodium hydroxide	10-67%	257° F.
Sodium hydroxide	67-80%	275° F.
Salt solutions		
Cupric chloride	All	Boiling
Sodium hypochlorite	5%	Room
Chlorine, air, water:		
Air		340° F.
Chlorine dry	100%	Room
Chlorine water	Saturated	Room
Steam	100%	340° F.
Water	100%	Boiling
Organic solvents:		
Acetone	100%	Boiling
Amyl alcohol	100%	Boiling
Aniline	100%	Boiling
Benzene	100%	Boiling
Butyl alcohol	100%	Boiling
Butyl "cellosolve"	100%	Boiling
Carbon tetrachloride	100%	Boiling
Cellosolve	100%	Boiling
Chlorethylbenzene	100%	257° F.
Chloroform	100%	Boiling
Dowtherm	100%	340° F.
Ethyl alcohol	95%	Boiling
Ethylene dichloride	100%	Boiling
Ethyl mercaptan-water	Saturated	Boiling
Freon 11 and 12	100%	Room
Gasoline	100%	Boiling
Glycerin	100%	340° F.
Isopropyl acetate	100%	Boiling
Isopropyl alcohol	100%	Boiling
Isopropyl ether	100%	Boiling
Kerosene	100%	Boiling
Methyl isobutyl ketone	100%	Boiling
Methyl alcohol	100%	Boiling
Monochlorobenzene	100%	Boiling
Octyl alcohol	100%	Boiling
Paraldehyde	100%	Boiling
Tetrachlorethane, Sym.	100%	Boiling
Trichlorethylene	100%	Boiling

TABLE 2—TYPICAL PHYSICAL PROPERTIES

Material—	Apparent density (lb./cu. ft.)	Strength, psi. Tensile	Compressive	Transverse	Modulus of elasticity (psi.)	Izod impact strength* (ft. lb./in. of Notch)	Thermal expansion coefficient per °F.	Thermal conductivity B.t.u./hr. (sq. ft.) (°F./ft.)
Carbon—plain	94	900	7,000	2,700	1.9×10^6	0.27	0.18×10^{-5}	3
Carbon—impervious	110	1,800	10,500	4,400	2.8×10^6	....	0.30×10^{-5}	3
Graphite—plain	105	800	5,500	2,800	1.4×10^6	....	0.12×10^{-5}	85
Graphite—impervious	117	2,400	10,000	4,800	2.2×10^6	0.32	0.23×10^{-5}	85

*A.S.T.M. Method D256-43T.

Resistance of Plastics to Solvents and Chemicals

THE resistance of organic plastics to chemical reagents shows wide variation, some being highly impervious to most chemicals, whereas others are readily compatible with a broad selection of organic solvents. With respect to acids, plastics compare favorably with the more common metals, strongly resisting attack.

Water is an effective solvent for some plastic materials, and a partial solvent for others. Plastics may be grouped as follows in regard to their comparative resistance to water:

Best resistance.—Polystyrene, polyethylene, furane resins, polyvinyl chloride acetate, polyvinylidene chloride.

Good resistance.—Phenol formaldehyde, polyesters, polymethyl methacrylate.

Fair resistance. — Polyvinyl butyrals, urea and melamine, formaldehyde, cellulose acetate, cellulose nitrate, polyamides, ethylcellulose, cellulose acetate butyrate.

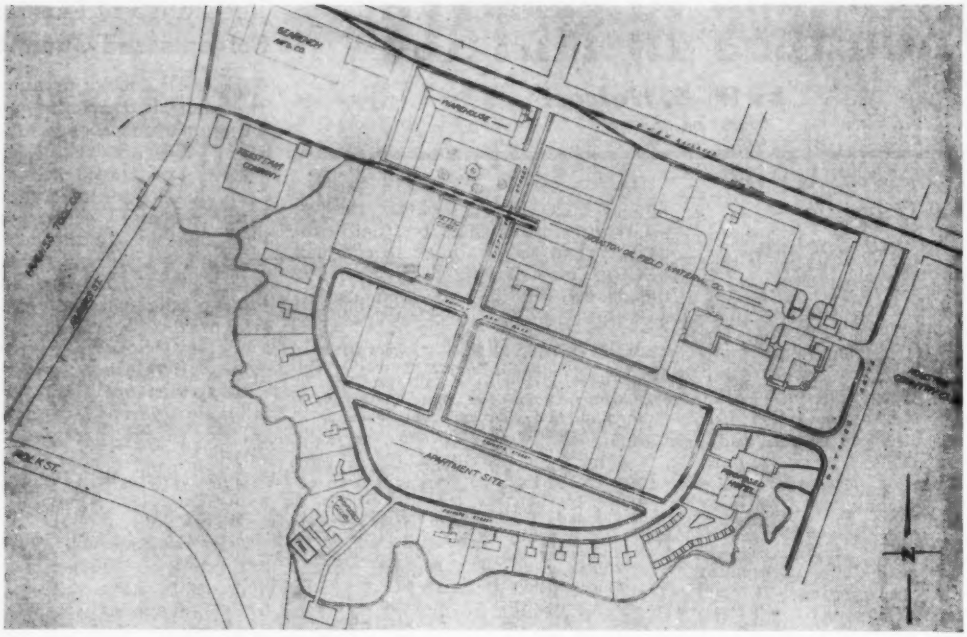
Organic solvents may be true solvents, partial solvents, or nonsolvents for the various plastics. Partial solvents may cause loss of strength or some swelling without causing solution. Some common plastics and their solvents are: **Cellulose nitrate**—acetone, ethyl acetate, butyl acetate; **cellulose acetate**—acetone, ethyl acetate, 70 per cent ethylene dichloride, 30 per cent methanol; **cellulose acetate-butyrate**—acetone, chloroform, ethyl acetate; **polystyrene**—styrene monomer, benzene, acetone, toluene; **polyvinyl butyral**—furfural, alcohol; **polymethyl methacrylate** — monomer of acrylic, ethylene dichloride, chloroform, glacial acetic acid; **polyvinyl chloride-acetate**—methyl ethyl ketone for 87/13 proportions, isophorone, mesityl oxide, cyclohexanone (for higher chloride content); **polyamides**—hot formic acid, phenol, resorcinol; **polyethylene** — hot xylene, benzene; **polyvinylidene chloride**—hot orthodichlorobenzene; **ethyl cellulose**—acetone, 80/20 benzene-alcohol.

When resistance to oil and grease is required, plastics of the nonrigid polyvinyl alcohol, polyvinyl chloride, and polyvinylidene chloride types are representative. Some of the synthetic rubbers are also useful for this purpose.

In general, plastics show good resistance to acids and alkalies. From the standpoint of acid resistance, chlorinated rubber, polyisobutylene, polyethylene, tetrafluoroethylene, polydichlorostyrene, chlorinated neoprene, polystyrene, polyvinylidene chloride, polyvinyl chloride, and polyvinyl chloride-acetate are acceptable.

References

Condensed from Plastics Vol. 3, page 36, Nov. 1945; taken from March 1946 issue of Materials and Methods.



Plot plan of oil-well-supply center now under construction in Houston

Huge Oil-Well-Supply Center Under Construction in Houston

AN immense oil-well-supply center is now under construction in Houston. This project, which is located on a 66-acre tract of choice land within the 3-mile circle of downtown Houston, will eventually represent expenditures amounting to over $5,000,000.

The center, the first planned venture of its kind, has been architecturally designed with emphasis both on the attractiveness and practicability of structural arrangement. And it will be for the exclusive accommodation of oil-well-supply and related concerns.

The announcement of plans include an Oil Supply Row Boulevard running through the central portion of the property, 30 industrial sites, space for apartments, residential sites and playgrounds, an ultramodern hotel, and a new country club complete with a large swimming pool. The center has been envisioned as a future meeting place for oil men from over the world. Supply Row Boulevard in the future will be reminiscent of an oil exposition, insofar as the concentration of modern oil-well equipment is concerned.

The land upon which the center is being constructed is the last of its kind within the close-in area of Houston. Its present boundaries not only lend an exclusive effect to the oil-center property, but they also prevent possible encroachment of other types of industries. The G. H. & H. Railroad bounds the property on the north; the Houston Country club adjoins it on the east; Hughes Tool Co. on the west, and Country Club Bayou on the south.

Size of Industrial Sites

The project is being developed by Texestate Corp. John Sheesley, president of Bettis Sales Co., and also secretary and treasurer of Texestate, is taking an active interest in the development of the center. The industrial sites in the area will range from 12½ acres down to 15,000 sq. ft. Work is now in progress on all streets, and a railroad spur.

While a number of companies have not completed their plans for location in the center, several have made definite arrangements for inclusion. Houston Oil Field Material Co. was the first concern to be located in the center. This company has a 12½-acre site and the first units of a group of buildings to cost $750,000 have already been erected. An example of the consideration which has been given to future requirements is the fact that Homco buildings have been designed to accommodate helicopter landings. This company also plans to build a large warehouse and an L-shaped office building with a penthouse. A manufacturing plant, service garage, and chemical building will be located behind the offices.

Types of Structures

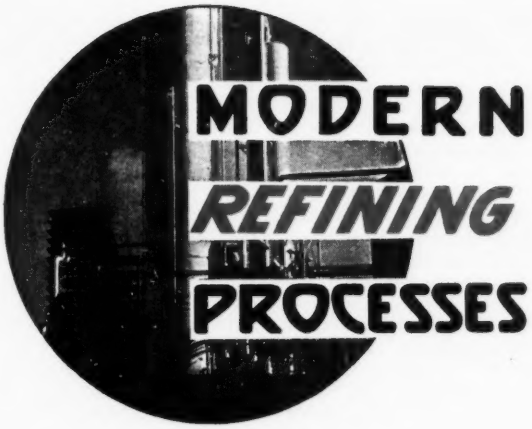
H. W. McCormick Co., a concern which builds and operates steel warehouses, has purchased 3 acres in the center. The first unit to be constructed on this location will be a warehouse. This structure will cost $165,000 and should be completed within the next few months.

Texestate Corp. will build on a 3-acre site, four large warehouses arranged in an E shape. The cost of this construction will amount to approximately $600,000. The warehouse will be of fireproof masonry construction and will have club rooms for employes and cafeteria service.

Gearench Manufacturing Co. has a 3-acre site at one corner of the tract. Adjacent to this, Texsteam Corp. has a 3-acre location.

The hotel planned for this area will cost in the neighborhood of a quarter of a million dollars and will be located in the residential site. It will be completely air conditioned and will have all the latest improvements and conveniences known in hotel construction.

According to John Sheesley, restriction of the center to oil-supply and related concerns will be rigidly enforced, and many applications of unrelated concerns have already been rejected.



NO. 14 IN A SERIES

ISOMATE process first demonstrated the practicability of isomerizing low-grade naphthas for aviation or motor fuel blending during the recent war. Hydrogen is introduced to minimize cracking by anhydrous $AlCl_3$ during the reaction of isomerization. High reaction pressures in the presence of hydrogen make for longer catalyst life by hydrogenating the catalyst complex and slowing the dehydrogenation reaction thereon. Recycling gives best yields and highest-octane-number product. The $AlCl_3$ content of the catalyst complex should be held below about 70 per cent, to prevent $AlCl_3$ from dissolving appreciably in the charge. Up to 93 per cent of 91-octane-number neohexane is formed at 4:1 recycle ratio.

Isomerization of Normally Liquid Hydrocarbons

1 — Hexane

by George Armistead, Jr.

THE isomerization of various hydrocarbons achieved wide use during World War 2, of which the most extensive was the isomerization of normal butane as a means of augmenting alkylation-plant feed supply. During the war period two commercial installations were made for isomerization of normal pentane, two installations for the isomerization of hexanes, and two installations for the isomerization of naphthenes in connection with toluene manufacture. Another process involving the isomerization of the higher olefins has also been announced[5] although no commercial operations are known to be in use. While the manufacture of large quantities of isobutane by isomerization lost much importance with the reduction in aviation gasoline production at the end of the war, processes for the isomerization of constituents normally present in gasoline are of potential peacetime importance because of the octane improvement usually inherent in such processes and the apparent eventual need for employing many types of octane improvement on the straight-run constituents of motor gasoline.

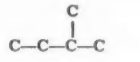
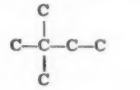
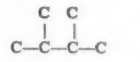
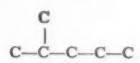
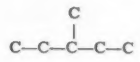
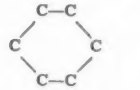
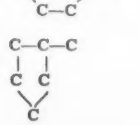
The processes developed by Standard Oil Co. (Indiana) for the isomerization of normal pentane (b.p. 97° F.) and normal hexane (b.p. 156° F.) were employed commercially for the first time during the war and demonstrated clearly the possibilities of this process in its present stage of development for the manufacture of aviation blending components. The various modifications of the process were discussed by Evering, Fragen, and Weems[1] and by Swearingen, Geckler, and Nysewander[2] and the processes have also been described elsewhere in the literature.[3,4] Since the isomerization of naphthenes was not directed at the production of gasoline constituents, it is not considered in detail herein.

Table 14-1 illustrates the properties of various C_5 and C_6 hydrocarbons including octane numbers. The outstanding feature, with respect to use in motor gasoline, is the comparatively low octane number of normal pentane and normal hexane and the much higher rating of their isomers. All straightrun gasolines contain natural mixtures of the various isomers with the over-all properties varying in accordance with the composition.

The Isomate Process

The isomate process employs a catalyst composed of liquid aluminum chloride-hydrocarbon complex promoted with anhydrous hydrogen

TABLE 14-1—PROPERTIES OF PENTANES AND HEXANES

Hydrocarbon—	Formula	Boiling point, °F.	R.v.p.	Octane No. A.S.T.M.	Octane No. C.F.R.-R.
Pentanes:					
n-Pentane		97	15.5	61.9	61.7
Isopentane		82	21.0	90.3	92.3
Hexanes:					
n-Hexane		156	5.0	26.0	24.8
Neohexane		122	9.4	93.4	91.8
Diisopropyl		136	7.1	94.3	Iso (+0.32 cc. TEL)
2-Methylpentane		141	6.5	73.0	73.4
3-Methylpentane		146	5.8	75.0	74.5
Cyclohexane		176	3.4	78.6	83.0
Methylcyclopentane		160	4.3	80.0	91.3

chloride. Aluminum chloride, which is widely employed in butane isomerization, is also an active cracking catalyst, having been employed commercially for this purpose. Cracking is undesirable both from the standpoints of degrading the feed from gasoline to fuel gas and reduction in life of the catalyst. Consequently, under the conditions employed in the process, a suppressant of cracking, which may be either a small amount of hydrogen or benzol, is introduced to reduce cracking to a minimum. As pointed out by Evering et al,[1] and Swearingen et al,[2] there are established equilibria between the various isomers of each hydrocarbon at a given temperature in the presence of aluminum chloride and hydrogen chloride, these equilibria being generally favorable to the formation of branch chain forms of both C_5 and C_6 paraffins. The use of hydrogen serves both to suppress coke formation and to hydrogenate the catalyst complex, thereby prolonging its life. Increase in hydrogen pressure favors the prolongation of catalyst life, for which reason, pressures of 500 psig. or more are employed. The process, therefore, consists generally of passing a mixture of hexanes and/or pentanes through the catalyst and fractionating the resulting products to separate the isomers formed from the normal hydrocarbons which may with certain of the isomers be recycled through the process. Increased recycling gives greater ultimate conversion to the branched chain structure and consequently highest octane value of product.

Fig. 14-1 illustrates the flow through the process when applied to processing mixtures of pentanes and/or hexanes. The fresh feed to this process should contain the least possible amounts of C_4 and C_7 hydrocarbons, since the former do not isomerize appreciably under the conditions employed and the latter crack substantially under the conditions employed with detrimental effect on the catalyst. Actually the isomerization of C_7 hydrocarbons such as dimethylcyclopentane, for the production of methylcyclohexane, can be effected with aluminum chloride catalyst and has been done commercially for toluene production as mentioned in the foregoing. The reason that this can be done without prohibitive coking is the ease of isomerization of the C_7 naphthenes which permits a very mild catalyst, essentially inactive for cracking C_7 paraffins, to be used. The naphthene isomerization catalyst which is inactive for cracking the C_7 paraffin is also ineffective for isomerizing them. In the isomerization of paraffinic C_6 hydrocarbons with active aluminum chloride catalyst, a cracking inhibitor must be used and the C_7 concentration in the feed stock should not exceed about 2 per cent.

The feed passes first through the driers for removal of moisture and then into the HCl absorber where it recovers hydrogen chloride from the total effluent gas of the system. The feed leaving the HCl absorber next passes through a heater to raise it to reaction temperature, combines with a hydrogen stream and enters the reactor proper. The reactor comprises an open cylindrical vessel in which is maintained a level of the aluminum chloride catalyst complex which has a specific gravity of about 1.5 and a viscosity slightly higher than S.A.E. 50 lubricating oil.

The hydrocarbons are introduced through a distributor pipe in the reactor base, and being lighter, pass upward through the catalyst liquid, in the course of which, the isomerization reaction occurs. The reactor effluent is comparatively free of dissolved aluminum chloride due to the relatively greater solubility in the complex than in the hydrocarbons, and as long as the aluminum chloride content of the complex is below approximately 70 per cent, only about 0.01 weight per cent of $AlCl_3$ will dissolve in the reactor hydrocarbon throughput. The reactor effluent passes into the hot settler where any entrained complex is separated, thence through a pressure-reducing valve and cooler into the cold settler. Here the hydrogen and HCl are partly flashed from the hydrocarbons which then pass to the HCl stripper. In this vessel practically all the remaining HCl is stripped and returned to the HCl absorber, the stripped residue containing less than 0.01 weight per cent HCl. This stock, designated as isomate, is caustic and water washed for neutralization and passes then to the product fractionation system of which one form may be as follows.

The isomate enters the depentanizer, the overhead from which in turn passes to a debutanizer, with the overhead butanes from the latter eliminated from the system. The debutanizer bottoms go to the pentane splitter where isopentane is taken overhead and normal pentane separated as a bottoms cut which may be recycled to reactor system. The C_{6+} cut from the depentanizer bottoms goes first to the hexane splitter where isomeric hexanes including neohexane and diisopropyl are taken overhead as a product. The bottoms from the hexane splitter go to the rerun tower where normal hexane and methylpentanes are taken overhead for possible recycle to the reactor system and the C_6 naphthenes and heavier are removed from the rerun tower base.

Operating Conditions

Typical operating conditions when processing hexanes from Mid-Continent crude are as follows:

Reactor temperature, °F.	240-250
Reactor pressure, psig.	700-850
Space velocity, v./v./hr.	1.0-2.0
Catalyst depth, ft.	20-25
Hydrogen addition, S.C.F./bbl. reactor charge	50-180
HCl weight per cent of reactor charge	4-8
$AlCl_3$ injection rate per bbl. reactor charge	0.5-1.0

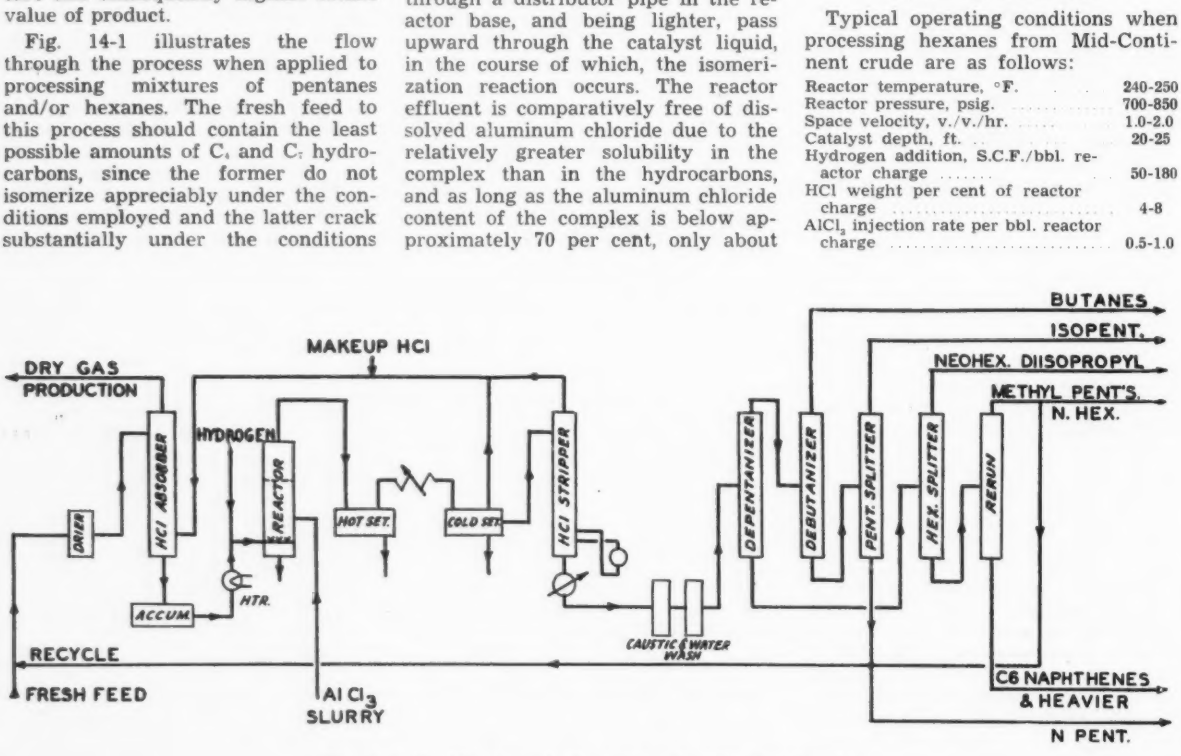


Fig. 14-1—Naphtha isomerization unit and product fractionation

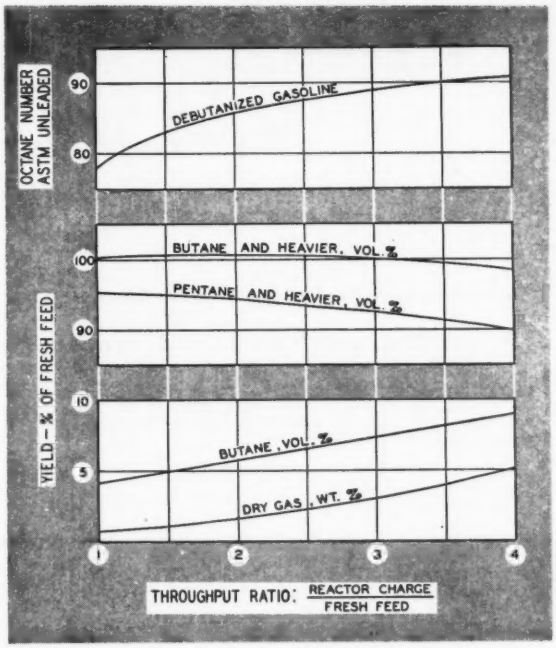


Fig. 14-2—Isomerization of a Mid-Continent hexane fraction (From Swearingen et al)[2]

Fig. 14-2, from Swearingen et al,[2] illustrates the effect on yields and quality of recycling to various degrees. It will be noted that with increased recycling, the ultimate yield of butane and heavier stays approximately constant at 100 per cent although there is a slight decrease down to about 90 per cent in the yield of pentane and heavier. The upper curve covers the quality of the composite neohexane and naphthene fractions, and with increasing recycle ratio this shows an increase in A.S.T.M. octane from about 78.5 with single-pass operation up to about 91 C.F.R.-M. at 4:1 recycle ratio. Under the latter conditions, actual c.p. neohexane content of the 91-octane mixture is about 82 per cent, and with proper fractionation such material can be separated for use as either motor gasoline or for aviation blending. The neohexane fraction of the debutanized gasoline (composite neohexane and naphthene fractions) is about 93.0 A.S.T.M. octane number, and contains a small amount (10 per cent) cyclopentane of 85 A.S.T.M. octane, because of the similarity of boiling point. Table 14-2 shows results from the isomerization of two feed stocks, the "neohexane" product being a superfractionated portion of the total isomate.

In the products of isomerization of mixed hexanes in this table the "neohexane" product is a superfractionated fraction of total isomate. It will be noted that the A.S.T.M. octane of 87.7 is substantially below that discussed above for the purified neohexane fraction. This is accounted for by differences in fractionation, the stock shown in Table 14-2 being prepared in a special run at Salt Lake City and fractionated in the available equipment. It is felt that with suitable fractionation equipment the commercial preparation of a 93+ A.S.T.M. octane neohexane is entirely feasible.

Note: A continuation of the chemistry and process engineering of "Isomerization and Isoforming" will appear in the next insertion of this series. It will deal with the role of normal pentane in these methods of manufacturing motor-fuel constituents.

References

1. B. L. Evering, N. Fragen, and G. S. Weems, "The Commercial Isomerization of Lighter Paraffins," The Oil and Gas Journal, Oct. 28, 1944, p. 77.

2. J. E. Swearingen, R. D. Geckler and C. W. Nysewander, "The Isomate Process," presented before the Houston, Tex., meeting of A.I.Ch.E., Apr. 1-3, 1946.

3. The Oil and Gas Journal, Mar. 31, 1945, p. 213.

4. The Oil and Gas Journal, Mar. 30, 1946, Catalytic Refining Section.

TABLE 14-2—TYPICAL ISOMATE FEED AND PRODUCTS

	35% pentanes, 65% mixed hexanes		Mixed hexanes		
	Feed	Isomate	Feed	Isomate	Neohexane
Gravity, °A.P.I.	77.8	80.8	71.3	71.2	86.3
Reid vapor pressure, psi.	10.0	10.0	4.9	7.1	11.0
A.S.T.M. distillation, °F.:					
Initial	106	108	145	115	110
10 per cent	117	113	149	130	112
50 per cent	130	127	152	149	118
90 per cent	149	160	157	185	126
Maximum	155	278	180	349	135
Octane ratings:					
C.F.R.-M., clear	70.1	79.8	69.5	79.4	87.7
1.0 cc./gal. TEL	80.0	89.7	80.3	89.4	100 + 0.04
3.0 cc./gal. TEL	87.2	95.9	86.5	93.6	100 + 0.67

Vacuum Distillation, Chemical Treating

(Continued from page 79)

streams are handled by 10-hp. vertical pumps. They are stripped each in a side stripper column with steam, vapors are returned to the tower, immediately above the drawoff. These fractions are the medium distillate, 1,650 bbl. per day; heavy distillate, 1,160 bbl. per day; and the extra heavy distillate, about 1,100 bbl. per day. The bottoms containing the caustic added originally just prior to entering the atmospheric tower are withdrawn at around 645° F., some 1,500 bbl. per day.

Treatment of Lubricating Fractions

The five main lubricating fractions receive essentially the same treatment after distillation. The variations are in the amounts of acid used, and of neutralization treat of soda ash; the heavier the viscosity of the fraction the heavier the acid treat, as is shown in Table 1. The light distillate receives 15 lb. of 98 per cent sulfuric acid per barrel, with 1.5 lb. of soda ash to neutralize it. The heaviest fraction is diluted with an equal volume of the 100-viscosity light oil to lower the viscosity and to simplify treating.

TABLE 2—PROPERTIES OF STRAIGHT-RUN GASOLINE

Gravity, °A.P.I.	53.0
Distillation:	
Init., °F.	125
10 per cent	200
50 per cent	260
90 per cent	324
Endpoint	420
Reid Vapor Pressure	3 lb.

Octane number:	A.S.T.M.	Research
Clear	69.3	71.7
With 3 cc. TEL	83.4	86.0

The routine of acid treating and neutralization is shown diagrammatically in Fig. 2. Each fraction is treated separately with the requisite amount of acid as shown in Table 1, is settled and neutralized with the required amount of caustic or soda ash as shown. The neutralized and hot-water-washed oil is filtered by percolation downward through filters charged with 17 tons of fullers earth and from which step they emerge as finished oils ready for sale or for blending to the required viscosity specifications. The diluted extra-heavy fraction is reduced in a shell still in the presence of steam and at 575° F. to remove the light (diluent) oil prior to filtration, which is carried out generally at 165° F. temperature to reduce viscosity and speed up the filtration. The recovered light diluent oil may be reused as desired.

Specifications for the several fractions as finished oils are shown in

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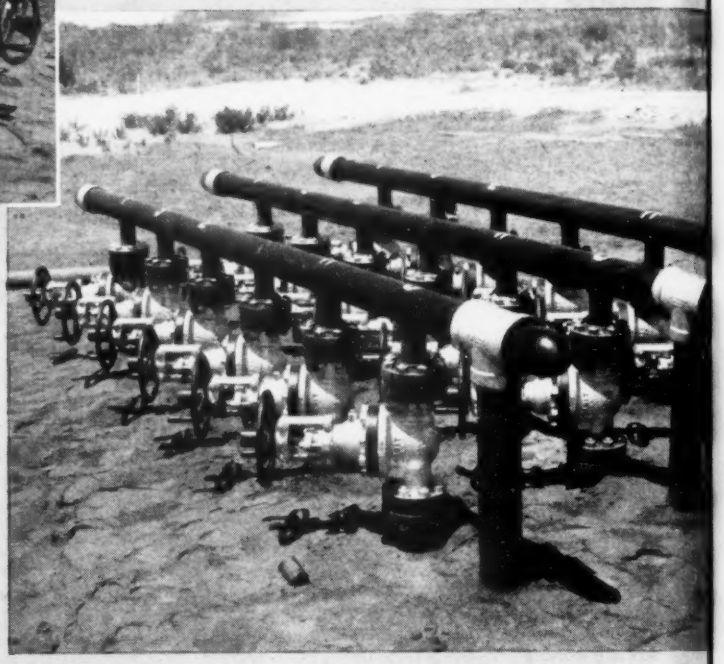

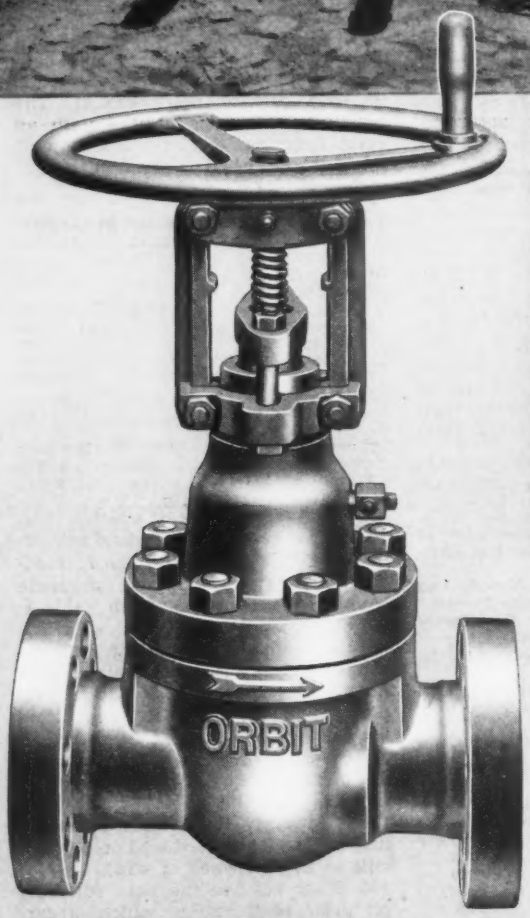

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Table 1, in which low carbon residue and pour points are balanced against low viscosity indices. The total gas-oil production from the operation shows about 350° F. initial boiling point and about 650° F. endpoint, and is very suitable for cracking stock. The straightrun gasoline obtained during the first step in reducing the crude shows the typical characteristics, indicated in Table 2.

Another product may be made on occasion, a heavy black oil, one grade of 1,000 S.U. viscosity at 210° F., another of 5,000 viscosity at 210° F., called "Onyx oil."

Operating Staff and Equipment

Operation of the unit itself requires, per shift, one fireman, one stillman, one assistant stillman, one inside helper, and one pumper, one-half time. Fuel consumption for the atmospheric tower heater is 55,000,000 B.t.u. per hour. For the vacuum tower heater it is 15,000,000 B.t.u., each heater showing about 70 per cent efficiency. The shell stills use about 50,000,000 B.t.u. per hour, showing some 50 per cent efficiency.

Plain carbon steel is used throughout the unit except in the caustic mixer in which the bottom head is lined with Fleetweld No. 5, welding rod by Lincoln Electric Co. Carbon steel tubes are used throughout the stills. No alloys are required for the pumps. The charge pump for the vacuum heater is an Ingersoll-Rand centrifugal, driven by a 200-hp., G.E. motor, taking suction at 12 psig. and discharging at 150 lb. The pump used on the vacuum tower bottom is a Quimby screw-type pump.

TABLE 3—TESTS—FINISHED OILS FROM BLENDED LUBE DISTILLATES, SINCLAIR REFINING CO., HOUSTON

Finished oil:	200 Pale	500 Pale	750 Pale
Treatment:			
Lb. acid/bbl. oil	20	25	30
Neutralization:			
Lb. soda ash/bbl. oil	1.5	2.0	2.5
Tests:			
Flash	340	385	410
Viscosity	205/100	509/100	750/100
Color	2+	2½	3—
Pour, °F.	—30	—10	—10
Acid No.	.03	.03	.03
Con. carbon res.	0.02	0.05	0.07

Capped 65,000,000 Cu. Ft. Well

(Continued from page 87)

mately 10 ft. long, and positioned the packer approximately 12 ft. below the base plate.

Responsibility for fabricating the prescribed assembly was assigned to Baash-Ross Tool Co.'s Los Angeles plant. While fabrication and construction of the assembly was in process, Pacific Crane & Rigging Co. moved a 60-ft. boom crane to the damaged well for the purpose of lowering the equipment into the well.

In stabbing the packer assembly, four guy lines were attached to the lower end of the packer to assist in stabilizing it over the slip stream. Two snubbing lines were fastened to the upper end of the packing assembly. The lines passed down through snatch blocks attached to eyes grouted in the cellar. The snubbing lines, after passing through the snatch blocks, were connected to the crane winch.

The packer was first hoisted into vertical position, then guyed into the slip stream immediately over the hole. As the boom line was paid off, lowering the packer, the snubbing lines pulled the assembly into the well.

The special packer was inserted to predetermined depth, the holddown slips released and the assembly elevated to expand the packing in the 11¾-in. pipe. Next, the 9-in. valve was closed. Then, it was disclosed that the 11¾-in. pipe had been cut out to a point below the seal level which was approximately 12 ft. below the base plate.

This unexpected situation prompted operators to attempt removal of the packer assembly to permit setting at greater depth and it was decided to use rubber as a sealing medium in the second packer to increase length of the packing cell, thus affording greater probability of sealing the surface casing.

While the second special packer was being assembled, operators left the first installation in place in order to protect the 11¾-in. casing as much as possible. When attempt was made to remove the first packer, it was discovered that the releasing mechanism had been sand cut and eroded to such an extent that the slips could not be released. While employing every conceivable means of disengaging the first packer without success, the erosion resulting from continued gas flow weakened the upper end of the 8⅝-in. nipple. The nipple and valve assembly were blown off but caused no damage to personnel because the boom line had been left attached. However, the 11¾-in. guide sleeve which was used in stabbing the packing assembly into the well and which was around the 8⅝-in. nipple, supporting the valve assembly above the base unit, was hurled more than 300 ft. into the air.

The original packer had not moved even when the upper portion of the assembly was blown off. About 4 ft. of the 8⅝-in nipple remained above the base plate.

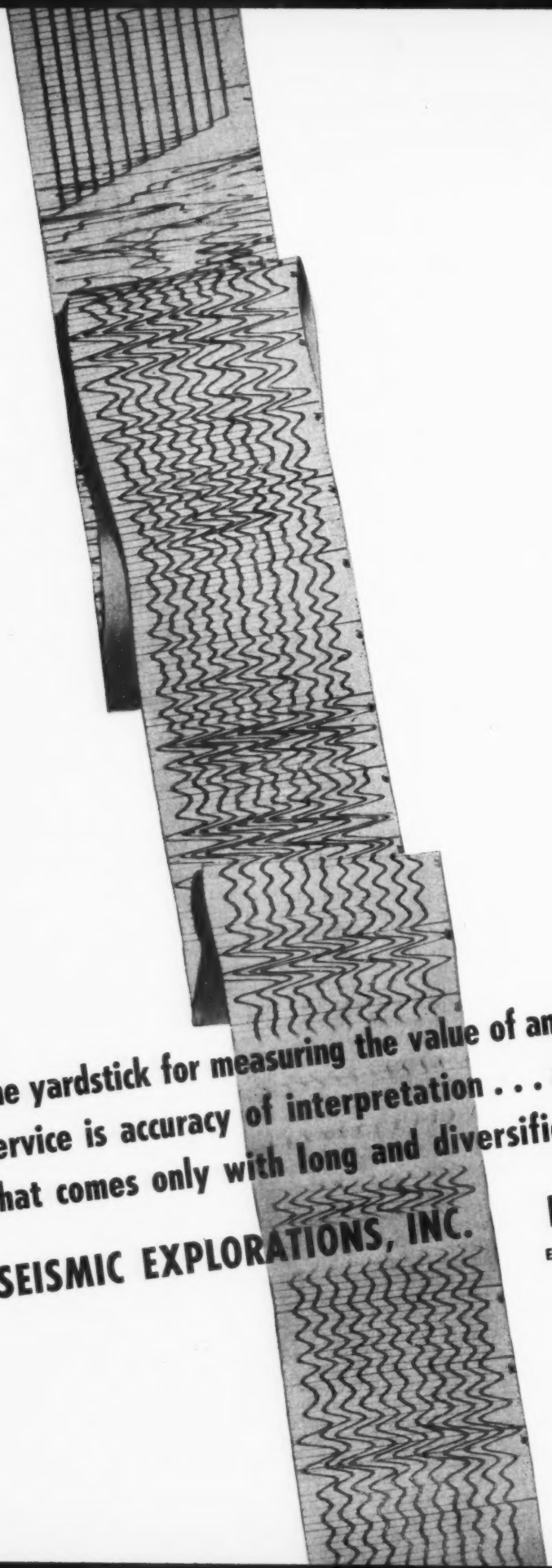
Faced with a new set of conditions, operators then decided to try moving the original packer downward far enough to permit setting a new packer at the higher point. A driving sleeve 45 ft. long and of appropriate diameter was selected to pass inside the 11¾-in. pipe and outside the 8⅝-in. nipple, contacting with the upper packer sub.

A safety clamp and a hardwood driving clamp were fastened to the driving sleeve. A 15-ft. length of 13⅜-in. casing was then telescoped over the upper end of the driving sleeve and projections were welded to the upper end of the latter so that the telescopic sleeve would have limited longitudinal movement between the wooden drive clamp and the upper end of the drive sleeve. An eye was welded to the upper end of the telescopic sleeve and received by the boom line.

When assembled, the entire driving unit was hoisted by the boom line and stabbed into the well in the same manner as was the original packer. With the snubbing lines holding the drive sleeve down on the upper packer sub, the telescopic sleeve was raised and dropped on the wooden drive clamp much in the same manner as a pile driver. The packer was thus driven down into the well to a point below the predetermined setting point of the second packer. The drive sleeve was left in the well to protect the 11¾-in. pipe while the second packer assembly was being made up on the lower end of the 30-ft. spacer nipple and while the manifold assembly, including the 9-in. gate valve and side arms, was assembled to the upper end of the spacing nipple.

After removing the drive sleeve, operators attempted to stab the second packer into the well. The slip stream was so violent, however, that rubber packing rings were blown from the assembly and it was impossible to stab the packer into the well.

Meanwhile, the erosive action of gas and foreign matter impinging on the 11¾-in. surface pipe increased with the passage of time and operators resorted to another expedient. The packer was laid down, displaced rubbers were reassembled in proper order, and the 10-ft. packing cell was spirally wrapped with black friction tape to encase not only the packing rubbers but the metal spacer rings as well. The assembly was then successfully stabbed into the well, was rotated to release the slips, was elevated slightly to cause the rubbers to expand and seal off in the 11¾-in. casing and the valves were closed, successfully shutting in the well.



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Scales: Their Occurrence And Causes

(Continued from page 77)

erence should be made to the table both before and after a preliminary field examination of the scale. Prior reference allows more intelligent examination, after which the remarks on origin and occurrence may be more easily correlated.

Details for Field Identification Outlined

The small amount of equipment necessary for field examination may be conveniently packed and transported in a wooden box. Directions for making the tests may be typed on a single sheet and secured to the box lid.

Equipment. — Hand lens or low-power microscope. Small glass beakers and test tubes, six each. Gas burner and connections. Platinum wire, 2-in. length sealed in glass rod. Small square of blue glass. Concentrated HCl, dilute HCl, $BaCl_2$ solution, approximately 10 per cent; lead acetate solution, approximately 5 per cent; distilled water, naphtha, acetone.

Procedure for Identification

1. **Preparation of sample.**—If sample is relatively free of oil, no preliminary treatment is necessary. Excess oil, if present, should be removed by washing the crushed sample first in naphtha and then acetone. Follow the acetone extraction by boiling in hot water to remove the water-soluble salts.

2. **Acid solubility; other tests.**—(a) Immerse a small piece of the material in dilute HCl. Fifteen per cent acid should be diluted 50:50 with water for this test. If solution takes place with vigorous evolution of gas, the scale is essentially composed of $CaCO_3$. If solution takes place more slowly with gas evolution it may contain only a small amount of $CaCO_3$ or it may be a mixture of $CaCO_3$ and $MgCO_3$, which "effervesces" more slowly. If the material is dark colored or black and the solution takes place with gas bubbles, then a test should be made for H_2S. Smelling is ordinarily sufficient for this test if not interfered with by strong acid fumes or oil. In case of any doubt, moisten a piece of paper with lead acetate solution and hold this over the gas. Darkening of the paper confirms the presence of H_2S, which in turn proves FeS in the sample. FeS is almost as black as carbon and only small amounts are required to cause entire sample to appear black. Thus, FeS may be roughly estimated in per cent of sample by observation under the microscope.

b. If a small piece of the scale fails to disappear in the acid, then it is probably the sulphate or iron oxide type of deposit. Iron oxide is either brown or red, while the sulphates are white in color. Heat the acid, gently at first, then boil to dissolve the iron oxide and other difficultly soluble material. The white material which remains is the major constituent to give further examination.

c. Boil the white material in concentrated HCl. If it slowly dissolves, dilute the clear solution about 50:50 with distilled water and add a few drops of $BaCl_2$ solution. A white precipitation shows the presence of SO_4 and the scale is gypsum.

If no apparent solution takes place in the concentrated HCl, crush the insoluble white residue to a fine powder. Moisten a platinum wire in concentrated HCl so that some of the powder will adhere to it. Hold the wire over a gas flame and observe the flame directly above the wire, using a piece of blue glass to screen out yellow (Na) flame. The immediate appearance of a crimson flame identifies Sr. Dip the wire again into concentrated HCl and repeat the flame test. The delayed appearance of a yellowish-green flame identifies Ba. The flame test thus selectively reveals Sr and Ba either singly or occurring together in the same sample.

The characteristics set forth in the foregoing discussion are immediately identifiable to a chemist. Anyone not having special training should be able to identify most scale deposits after a little practice with the test materials. A more complete discussion of the reactions involved in scale formation was recently published.[5] Also, more complete methods for the examination of scales have been described in the literature.[6,8] The above described method is intended only for the field examination and identification of scales other than those found in cooling systems and boilers. If a given sample of scale is not definitely identified by this procedure, or if it is known to occur either in a cooling system or boiler, then the problem should be referred to a competent chemist. Methods are now well developed which allow analysis of waters and calculation of their scale-forming or corrosive tendencies.[4]

TABLE 1—SCALE CLASSIFICATION AND OCCURRENCE

Class	Predominant characteristics	Major constituents	Method of origin and occurrence
1. Hard scales	**Practically acid-insoluble.** Usually light in color. May be dark due to impurities of oil, iron oxide, etc.	$BaSO_4$, $SrSO_4$, $CaSO_4 \cdot 2H_2O$ singly or in combination, usually some SiO_2.	**Mixing of waters.** In subsurface well equipment if well is leaking. Also in lead lines, separators and S.W.D. equipment where waters are mixed. Gypsum due to either mingling or supersaturation.
2. Soft scales	**Acid-soluble or mainly so** with CO_2 evolved. Usually light colored. May be dark due to impurities.	$CaCO_3$, with lesser quantities of $MgCO_3$, $FeCO_3$, Fe_2O_3, SiO_2, $CaSO_4 \cdot 2H_2O$, FeS, S.	**Supersaturation.** Rarely due to mixing of waters. In subsurface equipment due to loss of CO_2 by pressure release. In oil heaters. In S.W.D. equipment due to aeration where it may contain some FeS and free S.
3. Misc.	**Difficultly Acid-Soluble,** may evolve H_2S gas. Dark brown to **black in color.**	**FeS,** $Fe_2O_3 \cdot H_2O$, sulfur.	**Corrosion.** Subsurface and surface equipment. May occur in waste brine lines with carbonates. Found in sour oil storage tanks where products of corrosion are partially altered to the oxides and sulfur.

Chemical Reactions of Scale Formation

1. $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$
   $SrCl_2 + CaSO_4 \rightarrow SrSO_4 + CaCl_2$

Note: $CaSO_4$ will precipitate from solution by "common ion effect," for example, by mingling a brine which is saturated with gypsum with a brine high in $CaCl_2$. Evaporation or excessive heat will also cause precipitation of gypsum.

2. $Ca(HCO_3)_2 \rightarrow CaCO_3 + CO_2 + H_2O$

This reaction takes place also with the carbonates of Fe and Mg. Loss of pressure, heat and violent agitation are the main causes. Similar "supersaturation" may occur due to mingling a very salty brine with a fresh water which is highly charged with bicarbonate.

3. $Fe + H_2S \rightarrow FeS + H_2$
   $Fe_2O_3 + 3H_2S \rightarrow 2FeS + 3H_2O + S$
   $2Fe_2O_3 + 6H_2S \rightarrow 2Fe_2S_3 + 6H_2O$
   $2Fe_2S_3 + 3O_2 \rightarrow 2Fe_2O_3 + 6S$
   $6H_2S + 3O_2 \rightarrow 6H_2O + 6S$

A number of these reactions take place, depending on the amount of oxygen present[1,2]. If oxygen is present in the first reaction, the corrosion products will consist of iron sulphide and elementary sulfur. The iron sulphide goes finally to hydrated iron oxide in the presence of water and air. Scales due to corrosion are responsible for considerable field confusion concerning samples of corrosion or other types of scales.

Examples of Troublesome Hard Scale

Barium and strontium were described in the subsurface waters of West Virginia in 1906.[7] Other references have given details of the occurrence of these elements in Appalachian oil field waters.[8,9,10] Other published references have called attention to the occurrence of strontium in the subsurface waters at Eldorado, Kans.[11,12] Both barium and strontium are known to be present in the subsurface waters of a number of oil fields of Oklahoma, Kansas and Texas, and troublesome hard scale deposits have been experienced in these fields for many years.

The deposits composed of the sulphates of barium and strontium are invariably caused by the mingling of two unlike waters, one containing the soluble salts of these alkaline earths and the other containing a soluble sulphate. From this it follows that the identification of the barium or strontium scale in an oil well also constitutes proof that the well is leaking foreign water. There is no established rule for occurrence of the compounds which unite to form the hard scales. In the north Mid-Continent area it is more common for sulphate to be present in the formation water and the scale resulting from leakage of a barium or strontium water from above the pay horizon. However, barium occurs in the formation water, both at the Boston and Burbank pools of Oklahoma. In these cases, hard scales are due to leakage of sulphate waters from above the Bartlesville sand. Fig. 1 illustrates $BaSO_4$ deposits from the Boston field, Oklahoma. The tubing scale forms on the outside of tubing, also on the tubing interior and on the rods. The pellet type of deposit (Fig. 1) sometimes forms at the bottom of pumping wells in the Boston field. The pellet formation is generally attributed to agitation which occurs in the well bore which prevents adherence of the growth. Thus the phenomenon resembles limestone oolites in manner of origin. Well-defined nuclei are not always distinguishable. However, a thin section of a $BaSO_4$ pellet from a well in the Saratoga field, Texas, revealed a piece of iron rust as the nucleus.[13]

TABLE 2—CHEMICAL ANALYSIS OF TUBING SCALE, BOSTON POOL, OKLAHOMA

	Per cent
Moisture	0.46
Oil	1.02
Water soluble salts	0.87
Fe_2O_3	0.22
SiO_2	0.11
$CaCO_3$	0.65
$MgCO_3$	8.12
$SrCO_3$	4.45
$SrSO_4$	3.60
$BaSO_4$	80.10
Total	99.60

Many wells of the Boston field produce from the Arbuckle limestone which carries a sulphate brine. Hard scale in some of these wells is known to be due to leakage of the Bartlesville brine from above. The analyses of average Bartlesville and Arbuckle brines from the Boston field are shown in Table 3.

TABLE 3—CHEMICAL ANALYSES, BRINES FROM OIL ZONES IN THE BOSTON FIELD, OKLAHOMA

	Bartlesville sand mgms. per liter	Arbuckle limestone mgms. per liter
Na	52,000	58,400
Ca	10,790	13,910
Mg	1,807	2,182
Ba	250	nil
SO_4	nil	194
Cl	104,750	120,750
HCO_3	44	50
Total solids	169,651	195,486
Sp. gr.	1.120	1.140
	r.v.%	r.v.%
Na	38.38	37.21
Ca	9.11	10.16
Mg	2.51	2.63
SO_4	...	0.06
Cl	49.99	49.93
HCO_3	0.01	0.01
Total	100.00	100.00

TABLE 4—CHEMICAL ANALYSES OF OIL WELL WATERS, ELDORADO FIELD, KANSAS

	Kansas City lime mgm. per liter	Arbuckle lime mgm. per liter
Na	57,960	10,177
Ca	9,780	1,782
Mg	3,492	418
Sr	1,900	nil
SO_4	nil	2,800
Cl	116,800	17,090
HCO_3	66	340
Total solids	189,998	32,607
Sp. gr.	1.140	1.027

Strontium sulphate is less common than $BaSO_4$ in hard scales but is known to occur in several areas of southern Kansas where the bottom Ordovician water contains sulphate and one or more Pennsylvanian waters above contain the strontium salts. The strontium sulphate scale was particularly troublesome at Eldorado, Kans., where it was recognized as due to pipe leakage and mingling of brine from the Kansas City limestone with SO_4-bearing Arbuckle water. Fig. 2 shows specimens of the $SrSO_4$ scale which formed on the outside of tubing in wells of the Eldorado field. In these cases the scale was so thick that considerable difficulty was experienced in getting the tubing out of the well. Table 4 gives the approximate average characteristics of Kansas City Lime water and Arbuckle Lime water of the Eldorado field. The respective Sr and SO_4 contents indicate rapid accumulation of the scale where the two waters are allowed to mix.

Mingling of waters also sometimes causes the formation of hydrated calcium sulphate, or gypsum. It should now be recognized generally that the oil-field term "gyp" does not necessarily refer to gypsum alone. Rather, the term is usually applied to any troublesome accumulation. True gypsum formation may also be caused by slight evaporation of a water which is near saturation with this compound. Reduction in temperature or pressure with severe agitation may upset the equilibrium of oil well waters containing gypsum so that severe scale accumulation takes place in pumping equipment. An outstanding example of the latter type of gypsum precipitation occurs in the Smith-Mills Pool, Kentucky. Pumping oil wells in this pool are definitely producing only formation water. Nevertheless, rapid accumulation of gypsum in subsurface equipment is cause for frequent pulling jobs.

Fig. 3 shows a section of gas anchor which had become almost entirely closed with gypsum. This was removed from a well in the Smith-Mills pool which had suffered a gradual reduction in fluid production until only 14 bbl. per day were being produced at the time of the job. Many analyses of the producing formation (Cypress) water from Smith-Mills indicates that it is saturated with gypsum. Shaking this brine with powdered gypsum for several days produced no change in the sulphate content. It seems evident then that the Cypress brine contains a slight excess of gypsum, over the amount found by analysis, as it leaves the formation at the bottom of the wells. Slight physical changes taking place during production are evidently sufficient to cause a small amount of precipitation from all brine passing a given point, resulting in relatively rapid accumulation.

Table 5 gives the chemical analyses of Cypress formation water and gypsum deposit from the Smith-Mills pool, Kentucky. There are almost no variations in this brine from one well to another. Remarkable purity of the gypsum is shown in the analysis after removal of oil.

TABLE 5—BRINE AND SCALE ANALYSES, SMITH-MILLS POOL, KENTUCKY

	Cypress brine mgm. per liter
Na	29,222
Ca	3,037
Mg	1,035
SO_4	4,300
Cl	50,180
HCO_3	159
Total solids	87,933
Sp. gr.	1.064 at 60° F.
	Gypsum scale per cent
$CaSO_4 \cdot 2H_2O$	98.76
Fe_2O_3	0.89
Water soluble chlorides	trace
Total	99.65

Gypsum deposits which occur in water flooding operations, with possible remedial measures, were recently described in considerable detail.[14]

Deposits Mainly Due to Supersaturation

The acid-soluble or carbonate scales occur in subsurface equipment and in all surface equipment which handles water. This deposit is also frequently troublesome in salt water disposal systems where the waste brine has been allowed to aerate and become unstable. Carbonate deposits from subsurface equipment are usually fairly pure $CaCO_3$, with varying amounts of oil and iron oxide. Such accumulations in salt water disposal systems may also include FeS, free S, wind-blown silt and other impurities. The chemical reaction for the formation of $CaCO_3$ from solution is merely the loss of CO_2 from dissolved bicarbonate, as shown in Table 1. Calculations based on this reaction show

TABLE 6—SCALE AND WATER ANALYSES, HOBBS POOL, NEW MEXICO

Original scale sample:	
Sp. gr.	1.7
	Per cent
Water	2.8
Oil	10.6
Water-Sol. salts	1.5
$CaCO_3$ and impurities	85.0
Total	99.9
Water and oil-free sample after extraction:	Per cent
$CaCO_3$	95.5
$CaSO_4$	1.8
FeS	1.2
SiO_2	0.9
Total	99.4
	Water analysis mgm. per liter
Na	2,150
Ca	476
Mg	291
SO_4	54
Cl	4,755
HCO_3	2,335
H_2S	345
Total	10 406
Sp. gr	1.008

that the loss of 100 mgm. per liter of bicarbonate (HCO_3) in 1 bbl. of water will deposit 13 grams of $CaCO_3$.

Oil field brines are produced in New Mexico, Kansas, and West Texas which are quite highly "charged" with bicarbonate, so that release of pressure and escape of CO_2 allows $CaCO_3$ deposition at a much faster rate than might be considered possible. Fig. 4 illustrates a piece of scale ¾ in. in thickness which formed in the lead line of a well near Hobbs, New Mexico, during 120 days of operation. Fig. 5 shows badly scaled tubing, removed from another well near Hobbs, after 5 months' production. This 2-in. tubing became so filled with the deposit that the internal diameter was only about ¾ in. in many places. Table 6 gives the analyses of this tubing scale and the water which produced it.

A few calculations on the rate of scale formation in this well are of interest. The specific gravity of the scale was determined and the volume of total scale in the tubing was computed. As a check on this method of determining total weight of scale in the tubing string, a section of the tubing was weighed, cleaned of scale and reweighed. The two methods gave rather consistent results and average figures showed 3,200 lb. of $CaCO_3$ scale in the tubing. The well was known to have produced 22.500 bbl. of water during the 5 months' time required for the scale accumulation. On the basis of 13 gms. scale deposition for each 100 mgm. loss in HCO_3 from each barrel of water produced, the reduction in bicarbonate during production of the water is indicated to be 496 mgm. per liter.

Calculation of Scale Deposition

HCO_3 reduction of 100 mgm./1. in 1 bbl. = 13 gms. scale,

therefore

$$\frac{1{,}451{,}520 \text{ gms. (3,200 lb.) scale}}{22{,}500 \text{ bbl. brine produced}} = 64.5 \text{ gms. scale deposited per bbl. brine,}$$

and

$$\frac{64.5 \text{ gms. scale/bbl. water}}{13} \times 100 = 496 \text{ mgm. per liter loss in } HCO_3 \text{ in produced brine}$$

The agreement of the above figures with tests on brine from the well is quite remarkable. Tests for HCO_3 on a "bottom-hole" sample of the brine gave 2,335 mgm. per liter. Similar tests on the brine taken at the separator showed 1,895 mgm. per liter of HCO_3, or loss of 440 mgm. per liter of HCO_3 due to pressure reduction and escape of CO_2 between the bottom of the well and the separator. Thus the chemical tests could have been used to predict rather accurately in advance the scale accumulation which actually took place.

Spectacular Scale Accumulation

Accumulations of this scale in surface equipment of the New Mexico area sometimes assume spectacular proportions. It is a common occurrence to remove several tons of the

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material from lease storage tanks during periodic cleaning. Lead lines, up to 6 in., have been noted almost entirely closed with the scale and wooden flumes carrying waste brine have been observed filled to a depth of 10 in. or more. Where waste brine is allowed to flow slowly into a central gathering pond, the deposit has a general appearance similar to that of the "travertine" which occurs at many mineral springs of the United States. An even more remarkable deposit of $CaCO_3$ may be seen in the present S. W. D. system at Luling, Texas, where the waste brine is encouraged to spread out and cascade over numerous steps. In this way the brine loses much of its CO_2, with resultant rapid deposition of the limestone-like material.

Plummer and Tapp have described the conditions at Luling in a recent comprehensive article[15] where the precipitation of $CaCO_3$ is shown to be aided by the growth of algae in the open ditches. Composition of the waste brine and deposited material at Luling are almost identical with those in the area of Hobbs, New Mexico. Waste brine from New Mexico producing wells contains more calcium bicarbonate and consequently gives more trouble from deposits in the producing equipment. However, the rate of deposition from the Luling brine is quite rapid subsequent to appreciable aeration. Change to the present method of handling waste brine at Luling was necessitated by frequent plugging of the 20-in. cast iron line which was in use several years ago.

Survey at Luling

In June, 1937, the writer made a survey of the system at Luling which included an earthen gathering basin, electric driven centrifugal pump, 4 miles of the 20-in. cast iron line and an earthen storage reservoir. At that time the system was handling 40,000 bbl. per day. No appreciable precipitation was taking place in the gathering basin where several lines dumped waste brine. However, rapid deposition took place in the line on the reservoir side of the pump. A joint of this 20-in. line was observed to be scaled so that only a 6-in. opening remained. The thickness of the deposit graded downward until almost no scale occurred 4 miles from the pump where the brine entered the storage reservoir.

Microscopic examination of water from the gathering basin was reported to show the presence of very fine suspended crystals of $CaCO_3$.[16] Evidently, the particles were too small to settle or accumulate at this point. The vigorous turbulence in the centrifugal pump caused impingement of the particles, with resultant agglomeration, increase in size and subsequent deposition. The phenomenon has been observed many places where turbulence is followed immediately by acceleration of deposits in water lines and flumes. Acceleration in the deposition rate of other types of scales may result in this same manner.

Scale Deposits of Salt Water Disposal Systems

A few of the scale deposits occurring in S. W. D. systems have been observed to be sulphates caused by mixing incompatible waters. However, most of the deposits in these systems are predominantly carbonate, with lesser amounts of iron sulphide or oxide. Free sulfur may be present if the water contains H_2S and wind-blown silt will always be present if the system is open. Fig. 6 shows a section of cement-lined tubing which became clogged with the carbonate-sulphide scale. This was removed from a waste water line carrying Devonian brine near Centralia, Ill. This brine contains H_2S which reacts with subsurface equipment to form finely divided iron sulphide which is in turn partially deposited along with $CaCO_3$.

The aeration of brine containing much H_2S causes the separation of sulfur, which then accumulates along with the $CaCO_3$ and FeS. This incomplete oxidation of H_2S takes place according to the equation shown in Table 1. Although S and $CaCO_3$ usual-

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ly combine to form a soft and easily removable deposit, rather hard scales of fairly pure sulfur have been noted in waste salt water lines. Table 7 shows the variable composition of some accumulations from S. W. D. systems.

It will be noted that the chemical composition of deposits from salt water disposal systems is not a direct function of the type of system being used. Rather, the nature of deposits formed is governed primarily by the nature of the brine produced, with the manner of handling the brine exerting a secondary influence. Thus, if analyses are available of the brine as it comes from the well, and the methods of handling are known, it may be determined in advance if troublesome deposits will occur. Also, the composition of the deposits, with the exception of the oil content, may be foretold with a fair degree of accuracy.

TABLE 7—SCALE AND SLUDGE FROM S.W.D. SYSTEMS
(Per cent)

Pool:	Valley Center, Kans.	Burrton, Kans.	Chase, Kans.	Centralia, Ill.
Source:	Bottom of disposal well	Line to disposal well	Bottom of aerating basin	Top of tubing, S.W.D. well
Type system:	Open	Semi-closed	Open	Semi-closed
Oil	3.6	69.0	*6.1	7.4
Sulfur	8.1	18.5	4.4	Trace
Water-Sol. Salts	2.7	Trace	0.5	Trace
$CaCO_3$	31.8	1.5	22.7	90.9
$CaSO_4$	6.3	Trace	Trace	1.1
FeS	44.5	7.0	31.8	0.4
Sand, Silt	2.5	3.7	33.5	nil
Total	99.5	99.7	99.0	99.8

*Includes H_2O.

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Heat Absorption and Radiant Section

THE approximate rate of radiant absorption is shown in Fig. 1 for stills in which one or two rows of tubes are used in the radiant section. The solid lines may be used for fuels ranging in gravity from 8° to 15° A.P.I., and the dotted lines for dry or wet cracked or refinery gases. Fig. 1 should not be applied to stills of freak design, or to those narrow stills in which the flame is closer to the tubes than about 2 ft.

The left scale of Fig. 1 shows a factor which consists of the absorption rate in B.t.u. per sq. ft. multiplied by tube diameter and divided by the center-to-center tube spacing. The figure is normally used by deciding from The Refiner's Notebook No. 111, September 21, 1946, or other sources what allowable radiant absorption rate (q) may be used and then reading from Fig. 1 what percentage of the heat generation will be absorbed in the radiant section.

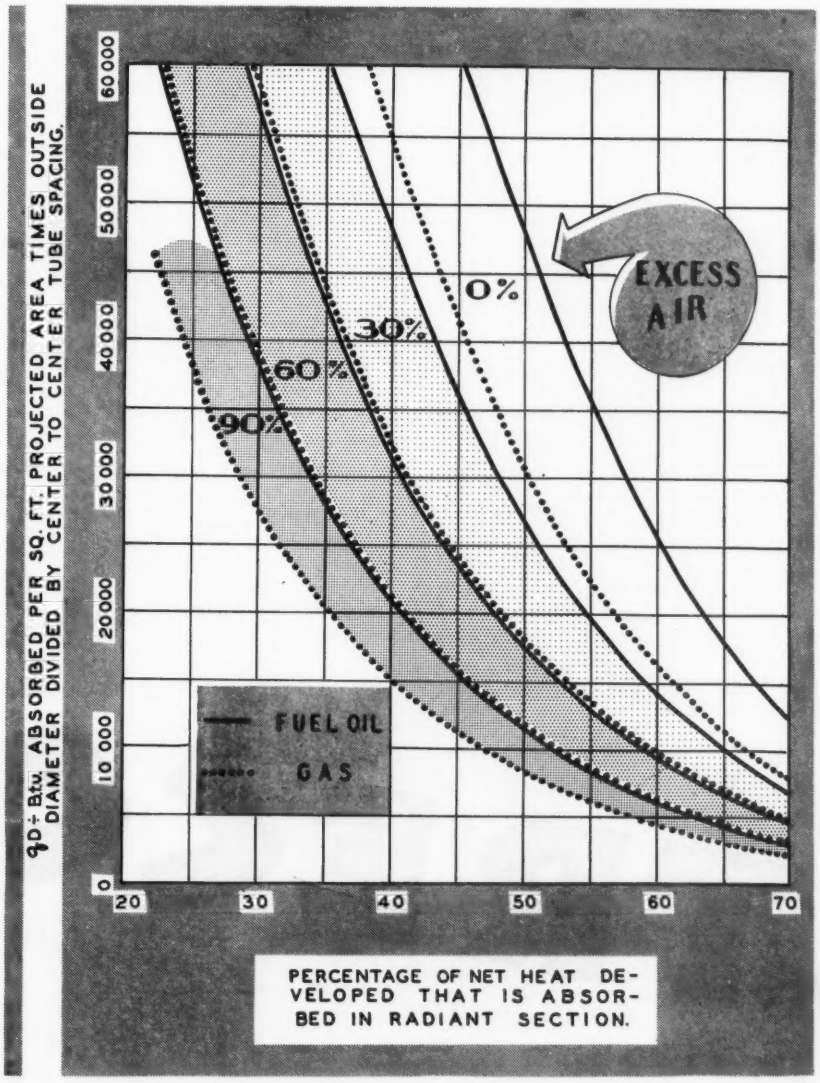

Fig. 1—Rate of radiant absorption in one and two-row simple stills (no flue gas recirculation or air preheat)

The expression "projected area" used herein refers to an area computed by multiplying the total effective tube length by the tube diameter (in feet).

Example. — For a delayed coking still a rate of 25,000 B.t.u. per sq. ft. projected area may be used. The tubes are 4-in. o.d. and the bends have a center-to-center spacing of 9 in.

$$q\frac{D}{C} = 25{,}000\frac{4}{9}$$

$$= 11{,}100$$

For a gaseous fuel, according to Fig. 1, the percentage of the total heat that will be absorbed in the radiant section will be:

At 60% xs air 51.0%
At 30% xs air 58.0%

Thus, if total heat developed is 10,000,000 B.t.u. per hour, the radiant heat absorption at 30 per cent excess air is 5,800,000 B.t.u. and the square feet of projected radiant surface is obtained by dividing by 25,000 or 232 sq. ft.

No. 112 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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Stretch of Sucker Rods (Continued)

Weight of fluids.—The total pressure exerted by a static fluid column is also a proportionality function, where the pressure is directly proportional to the specific weight of the fluid—i.e., the weight of a cubic foot or cubic inch, etc.—to the height of the fluid column and to the area of the surface over which the pressure is exerted. These relations can be expressed in mathematical form as follows:

$$P = w \times h \times A \qquad (1)$$

where

P = total pressure in lb.
w = specific weight in lb. per cu. ft. (62.4 lb.)
A = area in sq. ft.

Using the above in a sample problem, the pressure of a column of water 5 ft. high over an area of 1 sq. ft. is:

$P = 62.4 \times 5 \times 1 = 312$ lb., which is weight of water.

The equation finds its common application in problems where it is desirable to utilize the pressure exerted by a column of water 1 in. in area and the above problem may then be expressed as follows:

$$P = h \times 0.434 \times A \times 144 = 312 \text{ lb.}$$

where P equals total pressure as before, but the specific weight of the water is 0.434 lb., or that of a column 1 sq. in. in area and 1 ft. high; the constant 144 converts the area into square inches. The final results are the same.

Since oil gravities are ordinarily expressed as A.P.I. degrees, it will be necessary to use the specific gravity of the oil when problems involving oil as the fluid are to be solved. The specific gravity of oil can be found in numerous published tables such as the Circular 410 of the U. S. Bureau of Standards, or it can be readily computed from the following:

$$\text{Spec. grav.} = \frac{141.5}{131.5 + {}^\circ\text{A.P.I.}} \qquad (2)$$

Fig. 1 shows graphically the relation between the two scales within the range of 10° to 70° A.P.I.

The constants 62.4 (the weight of water per cubic foot) and 0.434 (the weight of a column of water 1 ft. high and 1 in. in area) are extremely useful to the petroleum engineer and should be memorized promptly. Many other constants such as the value of g (32.2) and the relation of metric units to English units—i.e., 1 in. equals 2.54 c. and 1° C. equals 1.8° F.—should also be memorized, since they are constantly used in the solution of oil-field problems.

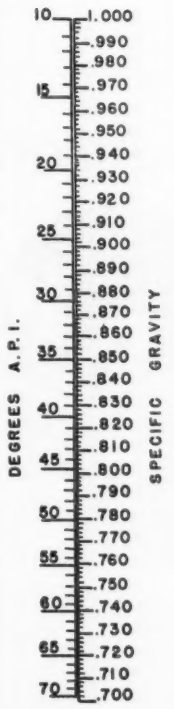

Fig. 1

Differential fluid load.—During the upstroke of the plunger, the traveling valve is closed and the standing valve is open, so that the actual pressure exerted upon the plunger is counterbalanced to a certain extent by pressure of fluid in annular space; net pressure is that of the head of fluid represented by the difference in height between the full column of fluid in the tubing and that in the annular space, corrected for the gravity of the fluid as compared with water.

Problem 1.—Given a steel cylinder whose internal diameter is 2 ft. and height 5 ft. What is the total pressure on the base of the cylinder when it is filled with water?

Solution:

$$\text{Pressure} = \pi \times \text{radius}^2 \times h \times 62.4$$
$$= 3.1416 \times 1 \times 5 \times 62.4$$
$$= 980 \text{ lb.}$$

Note that the pressure and the weight of the water are the same.

Problem 2.—Given the same steel cylinder as above, but it is now covered by a closely fitting steel plate which has a hole drilled in the top into which is screwed a vertical pipe 30 ft. long and ½ in. internal diameter. If the entire system of cylinder and pipe is filled with water, what is the pressure on the base of the cylinder?

Solution: Since the pressure is transmitted in all directions (Pascal's law) in such a container, the pressure due to the long column of water in the small pipe is the same as though the cylinder itself were 30 ft. longer.

$$\text{Pressure} = \pi \times \text{radius}^2 \times h \times 62.4$$
$$= 3.1416 \times 1 \times 35 \times 62.4$$
$$= 6{,}860 \text{ lb.}$$

In this case the weight of the water is $\pi \times 1 \times 5 \times 62.4 + \pi \times (1/48)^2 \times 30 \times 62.4 = 980 + 2.55 = 982.55$ lb.

Problem 3.—If the cylinder in Problem 1 is filled with oil whose A.P.I. gravity is 42°, what will be the pressure on the bottom of the cylinder?

Solution: Specific gravity of oil

$$= \frac{141.5}{131.5 + 42} = 0.815$$

$$\text{Pressure} = \pi \times \text{radius}^2 \times h \times 62.4 \times 0.815 \text{ or } 980 \times 0.815 = 798.7 \text{ lb.}$$

Problem 4.—Given a well 4,000 ft. deep partially filled with oil so that a fluid level measurement shows oil in the annular space 800 ft. from the top of the hole. If the pump is set at a depth of 3,200 ft. and the gravity of the oil is 36° A.P.I., what is the differential pressure at the pump on the upstroke in pounds per square inch?

Solution: 3,200 — 800 = length of fluid column above the pump = 2,400 ft.

Specific gravity of oil

$$= \frac{141.5}{131.5 + 36} = 0.845$$

Fluid pressure per foot of depth $= 0.434 \times 0.845 = 0.367$.

Since area is 1 sq. in.:

$3{,}200 \times 0.367$ = pressure per sq. in. on the top of traveling valve

$2{,}400 \times 0.367$ = pressure per sq. in. below traveling valve

$(3{,}200 - 2{,}400)\ 0.367 = 293.6$ lb. = differential pressure.

Series prepared by Dr. E. A. Stephenson, head of petroleum engineering school, University of Kansas

Oil resistant . . . Water resistant . . . Resistant to deterioration at high temperatures . . . Able to withstand high gas pressures and hold form under extreme loads—Just a few Perbunan Synthetic Rubber qualities that give economy in oil operation. Take advantage of Perbunan for oil handling. Specify it for: *Oil suction and discharge hose . . . Pump pistons and parts . . . Fittings . . . Gaskets . . . Packings*. Write for further information. Stanco Distributors, Inc., 26 Broadway, New York 4, N.Y.

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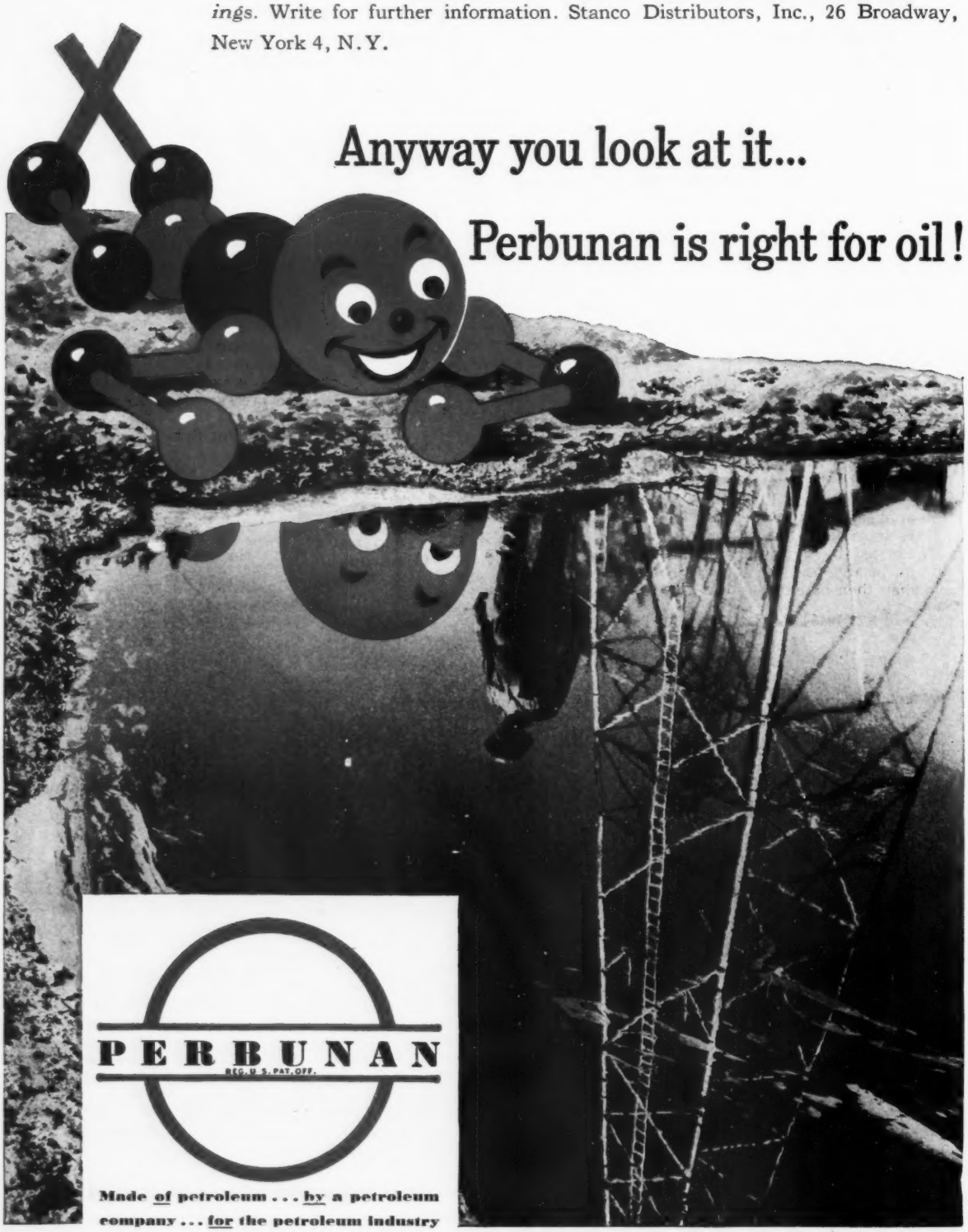

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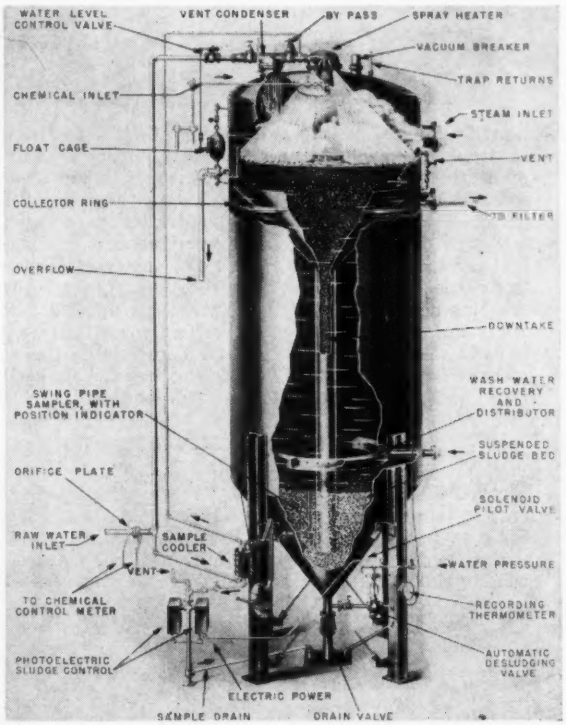
OIL AND GAS EQUIPMENT Digest

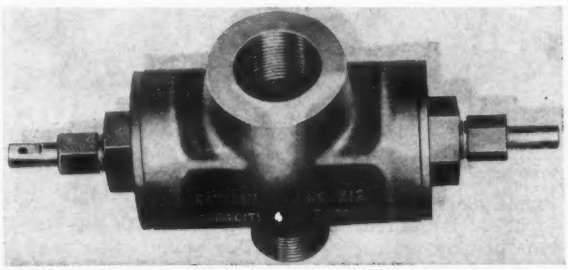
IT'S NEW ✓ CHECK IT

by Kenneth B. Barnes

(1) HOT PROCESS WATER SOFTENER effects improved boiler feed water and substantial savings in chemicals. It also reduces the turbidity of softened water. In the tank, suspended sludge forms a bed which acts as a filter screen for fine particles. This bed, coupled with the slow upward flow throughout the full cross-section of the settling tank, gives an effluent lower in turbidity than that obtained in older types of softeners. The sludge blanket reduces the amount of lime required to soften water, since unconsumed lime is retained in the blanket until it reacts with water hardness. When the sludge blanket has considerable oxide or hydroxide of magnesium, a higher degree of silica removal is effected. Each particle of silica has an intimate and prolonged contact with the magnesia which removes silica by adsorption. An automatically operated desludging valve, actuated by an electronic turbidity detector, controls the depth of the sludge bed. The detector continuously measures a water sample passing through the bed and between a light source and photoelectric tube. *The Permutit Co.*

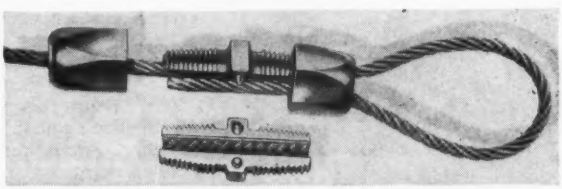


IT'S NEW ✓ CHECK IT



(2) NEW 212 BLOWOUT PREVENTER can be used for swabbing or running rods in wells that head or flow in the course of operations. To change rubbers it is only necessary to unscrew the plugs at each end; old rubbers can be removed and new ones inserted. In 2½ and 3-in. sizes. Two of these blowout preventers of the same size, with a nipple of any required length in between, also make a very efficient unit for swabbing. *J. P. Ratigan.*

IT'S NEW ✓ CHECK IT



(3) SAFE-LINE WIRE-ROPE CLAMP gives equal distribution of the gripping pressure on the rope over a large area, doing away with any possibility of cutting action. It completely encloses the sharp wire ends, and with its

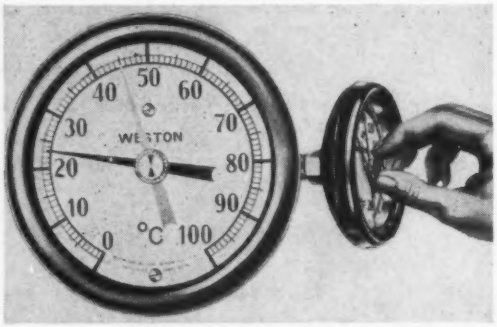
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

streamlined shape prevents scratching and catching hazards. Made of high-tensile-strength alloy steel forgings and master-coined to fit rope sizes 1/16 to 3/4 in. *National Production Co.*

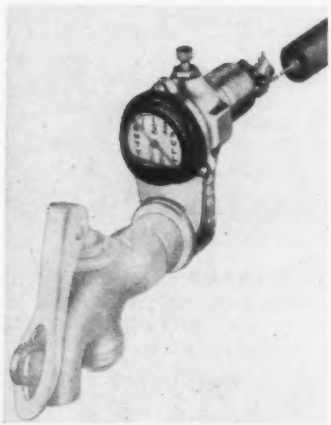
IT'S NEW CHECK IT

(4) NEW MINIMUM-MAXIMUM THERMOMETER, all-metal, has an auxiliary red index which is manually set by a finger knob which protrudes from the center of the



scale glass. When a record of the lowest temperature reached is desired, this index is placed to the low side of the temperature pointer. The pointer will move the index to the lowest temperature reached during any operating period, and the index will remain at that low point until manually reset. For a record of the highest temperature reached, the index is simply set at the high side of the pointer. Two models, scale diameters of 3 to 5 in. Available in all the usual Weston ranges. *Weston Electrical Instrument Corp.*

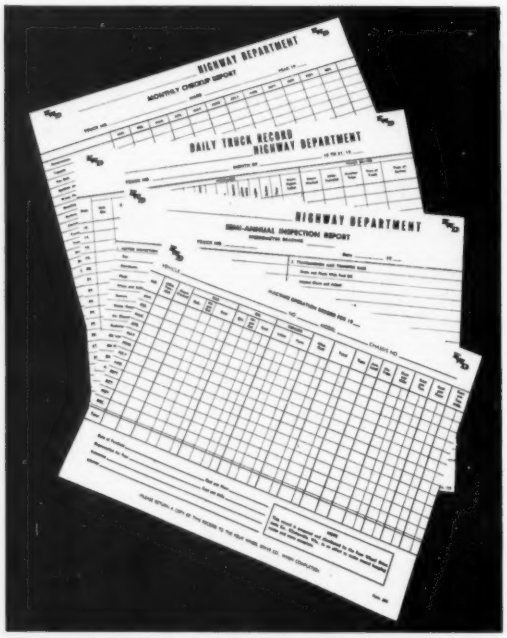
IT'S NEW CHECK IT



(5) STEEL DRUM CONTENTS—the "inside story" is revealed at a glance. This is done by the new U. C. Indicator, and makes easier kept inventories, plus guarding against pilfering, maintaining an accurate reorder system. The indicator makes tapping and measuring a thing of the past. For installation on all 50 and 30-gal steel drums. One of the most important and valuable advantages is the avoidance of last-minute shortages that frequently result when drums become empty sooner than expected. *U. C. Indicator Sales.*

IT'S NEW CHECK IT

(6) "COST-KITS" FOR TRUCKS, comprising four basic tables plus additional form for the driver in making his daily reports, are available free to all truck owners upon request. Developed by cost analysts over many years of truck manufacture and repair, this service is offered as an aid to owners who do not wish to set up an elaborate cost-keeping system, but who recognize importance of good figures in running a trucking business. Good records answer many questions like these: Is the truck effi-



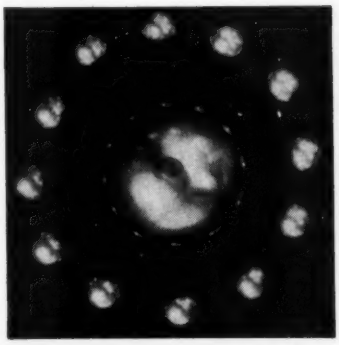
cient? Is the gas mileage high? Why? Which is the best size truck for the job? While highway departments were among the first to adopt this cost-keeping system, transportation companies also have found these simplified records to be a quick and accurate method of figuring costs. The daily, monthly, and yearly reports are simple and easy to maintain, yet cover all of the essential items. Totals arrived at in compiling the monthly and yearly operating cost records from the various trucks in a fleet supply an accurate basis for charging for outside work, for estimating future jobs, and for determining the relative efficiency of trucks. *Cost Records Dept., Service Div., The Four Wheel Drive Auto Co.*

IT'S NEW CHECK IT

(7) ANCHOR JOINT is newest in line of packless expansion joints. The joint combines rigid anchoring of piping at accessible points, with allowance for unequal thermal expansion and contraction on either side of the anchor point. This is accomplished by varying the num-

ber of bellows flanges on either side of the anchor base to accommodate each condition encountered. Joints are made for standard pipe sizes from ½ in. to 24 in. *Magni-Lastic Div. Cook Electric Co.*

IT'S NEW CHECK IT



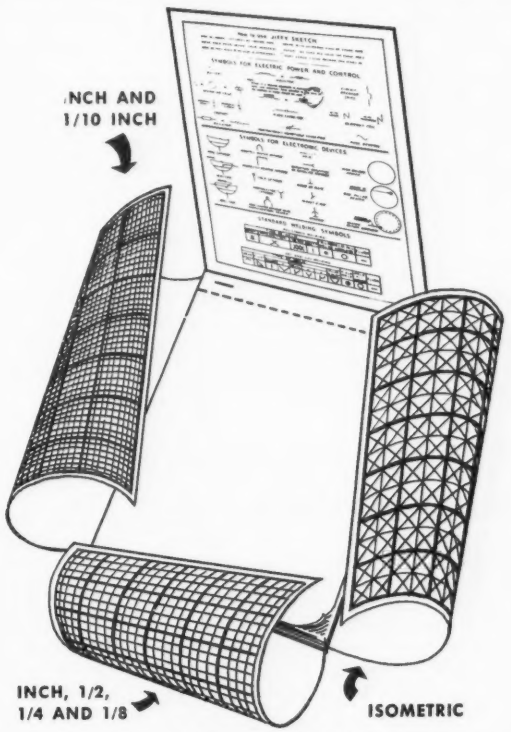
(8) TUNGSTEN CARBIDE BALLS in precision form are now made possible by new manufacturing methods. Retain their size for a long period of time. Their hardness, high compressive strength, in combination with their corrosion resistance, have made tungsten carbide balls invaluable for use in check valves on pumping equipment and similar service. *Industrial Tectonics.*

IT'S NEW CHECK IT

(9) MODERN TANK-COATING SERVICE is offered on large tanks for the prevention of corrosion. Portable twin air compressors are used for sand blasting. Four or more materials are available for complete servicing work, ranging in consistency from a light primer to a heavy plastic cement. Equipment has been developed which saves tedious hand brushing. On large tanks such as the portion of the 80,000-bbl. as pictured, special pumps and compressors convey the materials to the top of a 40-ft. portable scaffold where the operator applies protective materials with special spray guns. *Tank Seal Products Co.*

IT'S NEW CHECK IT

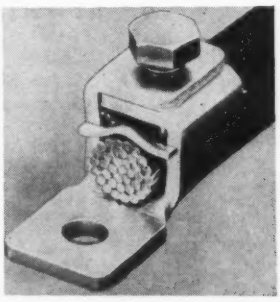
(10) JIFFY SKETCH is a new flap-enclosed scale drawing pad. Drawings can be made quickly, accurately, and to scale without use of ruler or T-square. Folding flaps on the outside provide for various scales and isometric projections. Drawing is made to scale with the aid of the



printed lines of the folding flaps which show through the tissue. The drawings can be blueprinted. There are no ruled lines on the tissue to confuse the drawing. Reverse side of the flaps contain numerous standard symbols for drafting, welding, electric power, structural, and other work. Particularly useful for field work where standard drafting supplies are cumbersome to carry. *Jiffy Sales Co.*

IT'S NEW CHECK IT

(11) NEW LARGE SCRULUGS have been added to the family of low-cost Burndy solderless lugs. The Scrulug is quickly installed on electric cables by simply tightening the clamping bolt which forces a pressure bar upon the cable. Formed from pure copper and brazed for added mechanical strength, the conductivity, pullout value, and performance of Scrulugs greatly exceed the Underwriters' Laboratories, Inc., requirements. *Burndy Engineering Co., Inc.*



IT'S NEW CHECK IT

TRADE LITERATURE

(12) DIESEL POWER FOR ROTARY AND CABLE-TOOL RIGS is the title of a new colored bulletin presented to the drilling industry. Liberally illustrated with scenes of actual operations, the booklet shows drilling new wells, powering a spudder, providing power for all rotary drilling equipment, and power for repressuring wells and pipe-line pumping. *Caterpillar Tractor Co.*

IT'S NEW ☑ CHECK IT

(13) A NEW COMPRESSOR BULLETIN is a 20-page well-illustrated brochure describing in detail the various exclusive design advancements of a new-type compressor unit. Also includes a cross-section diagram showing the location of various components, numerous other illustrations, and complete specifications. *Cooper-Bessemer Corp.*

IT'S NEW ☑ CHECK IT

(14) LONG BALL AND SEAT LIFE now possible through use of new metal called Tantung. Described as a new abrasion and corrosion resistant metal, in this brochure, this new material is also nonmagnetic and virtually unbreakable. Tantung balls and seats can be furnished in all standard sizes. *Jadon Equipment Co.*

IT'S NEW ☑ CHECK IT

(15) A SERIES OF EIGHTEEN informative articles has been prepared for the oil industry for distribution to all men in the fields, refineries, warehouses, laboratories, and other sections of the industry. It is a full coverage of all the services in the field of petroleum reservoir engineering. Upon request a file order of the first of the series will be mailed. Additional information will be developed and mailed each month until the series is complete. *Core Laboratories, Inc.*

IT'S NEW ☑ CHECK IT

(16) ANY SIZE AND ANY SERVICE describes fully the written and descriptive content of an interesting and attractive bulletin on couplings recently published. Designed for simplicity of information, this booklet incorporates the use of a thumb index to aid the reader. The thumb tabs are appropriately labeled as follows: "How to order," "Dimensions," "Formula selection," and "Simplified selection." *The Falk Corp.*

IT'S NEW ☑ CHECK IT

(17) FILTERS. New catalog illustrates pressure leaf and cartridge type filters for clarifying and polishing in industrial, marine, and general service. Newest pressure leaf filter breaks the tightest emulsion and removes oil from condensate down to 0.01 p.p.m. Structural features are illustrated and described, and handy tables give specifications. *The Blackburn-Smith Manufacturing Co.*

IT'S NEW ☑ CHECK IT

(18) "VEE" PACKING. Descriptive literature is available covering a new design principle in all-purpose molded "Vee" type packings. Seals completely with simple finger tightening, and is entirely automatic in performance. The "arrowhead reservoir" stores and distributes lubricant. *Green, Tweed & Co.*

IT'S NEW ☑ CHECK IT

(19) WHAT IS PREFORMED WIRE ROPE? Booklet in three colors tells story of the development of preformed wire rope and what that development has meant. In nontechnical language it tells what the preforming process does to the wires in a rope and what effect it has on the rope's final service. *Preformed Wire Rope Information Bureau.*

IT'S NEW ☑ CHECK IT

(20) PROTECTIVE COATING COMPARISON CHART. Eight-page technical bulletin gives complete factual information in condensed form about an entire line of coatings. Will be of interest to all those concerned with corrosion and contamination control problems. Also contains ready guide for selection of coating, preparation of the surface, and application methods. *Amercoat Division, American Pipe & Construction Co.*

IT'S NEW ☑ CHECK IT

(21) HARD-FACING ELECTRODES. New technical bulletin covering hard surfacing contains 16 pages of helpful information concerning such factors as effect of temperature and cooling rates on deposited metal, selection of rods, and recommended welding techniques. *Metal & Thermit Corp.*

IT'S NEW ☑ CHECK IT

(22) HEAT-EXCHANGER UNITS. New bulletin describes heat-exchanger units which eliminate water-supply problems. Typical applications and structural details are included for the benefit of process men wishing to avoid the problems of a water supply system for condensing and cooling fluids. *The Griscom-Russell Co.*

IT'S NEW ☑ CHECK IT

(23) TOOL-ROOM WHEELS. A 32-page catalog on grinding wheels for use in the tool room gives recommendations for sizes and grains as well as photographs of correct grinding procedures. Informative for those engaged in use and selection of grinding equipment. *Macklin Co.*

IT'S NEW ☑ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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REFINING

Riverton Refinery to Be Moved to Lloydminster

CODY, Wyo.—The 5,200-bbl. refinery of Husky Refining Co. located at Riverton, Wyo., which has been standing idle since the end of the war, will be moved to Lloydminster, Sask., Glenn Nielson, president of the company, announced here recently.

Production in fields near Vermilion, Alta., and Lloydminster is considered sufficient to warrant removal of the Riverton plant to that area, he said.

Refineries in California, Ohio Damaged by Fires

Considerable damage and loss of life resulted from fires in refineries in Ohio and California last week.

At least two persons were killed when an explosion and fire occurred at the East Toledo refinery of Sun Oil Co. The blast reported originated in the naphtha plant. In California, damage was estimated at $300,000 after fire destroyed one building and threatened other installations at the Richmond refinery of Standard Oil Co. of California. The fire was brought under control by company fire fighters.

California Research Corp. Lets Laboratory Contract

SAN FRANCISCO. — Contract for construction of a new process laboratory building at the Richmond refinery, a project costing $732,360, was awarded here last week by Standard Oil Co. of California's research subsidiary, California Research Corp. Work on the structure will begin immediately. Swinerton & Walberg Co. was the successful bidder.

The laboratory building is part of the $10,000,000 replacement, improvement, and new construction program at the Richmond refinery which was announced earlier in the year by Standard of California. The research structure will centralize facilities of California Research Corp. and will provide space for additional work which is being undertaken in the search for new and improved products and manufacturing techniques.

Refinery School Planned For Twenty-Second Year

Officials of the Bayonne, N. J., refinery of Tide Water Associated Oil Co. are making preparation to conduct a refinery school for company employes this fall and winter for the twenty-second consecutive year.

Designed to acquaint employes with practical information regarding refinery equipment and operations, the school is offered at no cost to those attending. Classes are held at 4:30 p.m. for an hour and a half, usually once each week. While the complete schedule has not yet been formulated, courses this season will include Process I and II, Plant Mathematics, and Plant Utilities.

U. S. Investigators Study New-Type German Gaskets

WASHINGTON. — Diesel engine gaskets developed by the Germans and thought to be cheaper and more efficient than similar American-made gaskets are now being investigated in Germany, according to the Office

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"TRANSPARENT"
DROP FORGED STEEL
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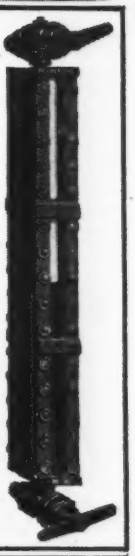
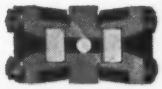


Used to observe color and density of liquids under high pressures and/or temperatures. Construction exceptionally sturdy. Made of alloy temperature resisting steel, and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Transparent" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.



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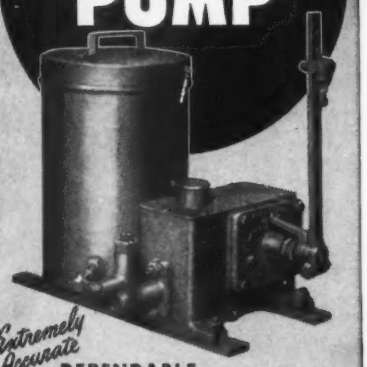

Extremely Accurate
DEPENDABLE
Accuracy of delivery in McCord chemical pumps is the result of a finely engineered design with a minimum number of parts. Dependability is insured because working parts are fully enclosed, protected from dirt and the elements. Specify McCord. For sale by National Supply Co.

Standard of the Oil Fields
McCORD
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of Technical Services, Department of Commerce.

The gaskets were used extensively in German diesel engine manufacture. They are made of plastic and metal shavings with a fine screen binder. Being soft, the gasket packing takes up irregularities in the castings.

Phillips Makes Available High-Purity Isooctane

BARTLESVILLE, Okla.—The availability in drum or tank-car quantities of still another paraffin hydrocarbon, isooctane (2,2,4-trimethylpentane) of high purity has been announced by the chemical products department, Phillips Petroleum Co.

This is the second new hydrocarbon development by Phillips in recent months. Pure-grade normal heptane was made available in April.

Isooctane is potentially usable as a special solvent and as a chemical intermediate; one of the long-accepted uses of this hydrocarbon is as a primary knock-testing reference fuel, used in conjunction with normal heptane.

Preliminary examination of production stream samples on the new isooctane product indicate the purity to be over 99.9 mol per cent. Some of the other properties are compared in the following tabulation:

	Pure isooctane (A.P.I. research project 44)	Properties of current production
A.S.T.M. octane number	.....	99.96
Density at 68° F. (20° C.) g. per ml.	.69193	.6920
Freezing point, °C.	—107.365	—107.43
Boiling point, °F.	210.63	.....
Boiling point, °C.	99.237	.....
Distillation:		
Temp. at 50 per cent recovery, °F.	.....	210.63
Temp. at 50 per cent recovery, °C.	.....	99.24
Temp. increase from 20 to 80 per cent recovery, °F.	.....	0.0
Temp. increase from 20 to 80 per cent recovery, °C.	.....	0.0

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FOR HOT OIL PUMP DRIVES or any other service where 100% dependability is demanded

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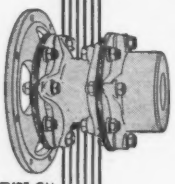
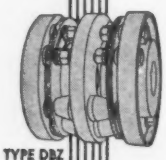


TYPE CM



TYPE DBZ

THOMAS Flexible COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float . . . and Eliminate BACKLASH, FRICTION, WEAR and CROSS-PULL
NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

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THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Shell Pipe Line Installs Teletypewriter System

HOUSTON.—Shell Pipe Line Corp. has replaced its private Morse-code telegraph service with teletypewriters, it was announced last week by F. W. Littell, superintendent of the company's communications and transportation department.

The new communications system includes automatic teletype machines located at Houston, Deer Park, Colorado City, and McCamey in Texas; Tulsa and Cushing in Oklahoma; and St. Louis, Mo., in addition to private and leased telephone lines along the company's 4,000 miles of pipe line in seven states. Connections through the relaying office in St. Louis permit teletype service to major cities on both East and West coasts. No reduction in personnel has resulted from the conversion, as services of former telegraphers not used in working the new machines have been utilized in other assignments.

Standard of New Jersey To Open Training Center

Centralized instruction for personnel of both the manufacturing and sales department of Standard Oil Co. of New Jersey and affiliates will be conducted in a new Esso Training Center scheduled to be opened soon in Elizabeth, N. J.

The center, to occupy 15,000 sq ft. of floor space, will function with a staff of eight instructors under the direction of the company's New York training department. Equipment to be used will include displays, models, a laboratory, and other training aids for use in courses on processes, products, marketing, specialties, and supervision. Accommodations will be available for handling six groups at one time. The new training center will not replace training courses at the refining and other field units, it was announced.

PIPE LINES

Price Given Contract for California Gas Line

LOS ANGELES.—H. C. Price Co., Bartlesville, Okla., last week was awarded a $3,750,000 contract for construction of the California portion of the Texas-California natural-gas pipe line.

Announcement of the award was made by Southern California Gas Co. and Southern Counties Gas Co. The line, one of the outstanding postwar projects of the natural-gas and pipeline industries, will extend from Dumas, in the Texas Panhandle, to Los Angeles. El Paso Natural Gas Co. will build the 988-mile section to the Arizona-California line at Blythe, Calif., and the two California gas companies, from Blythe to a point near Los Angeles.

The contract awarded Price calls for building 214 miles of 30-in. high-pressure pipe line. Construction is to start the first of the year and is to be completed in 7 months, it was announced. Details on the project were given in an article by A. F. Bridge, vice president and general manager of Southern Counties Gas Co., appearing on page 204 in The Oil and Gas Journal's Pipe-Line Number September 21.

The California line will be the largest high-pressure pipe line of its kind in the history of the natural-gas industry. H. C. Price Co., a California corporation with offices in Los Angeles, San Francisco, and Bartlesville, participated in building of both WEP big-inch lines during the war. H. C. Price, president, who was in Los Angeles last week to sign the contract, predicted that the new gas line, in view of its comparative size, will be known as the "biggest inch."

It is estimated that upwards of 1,000 men will be engaged in the field construction. The 60,000 tons of pipe required for the California portion of the line is now being fabricated in Los Angeles by Consolidated Steel Corp., Ltd.

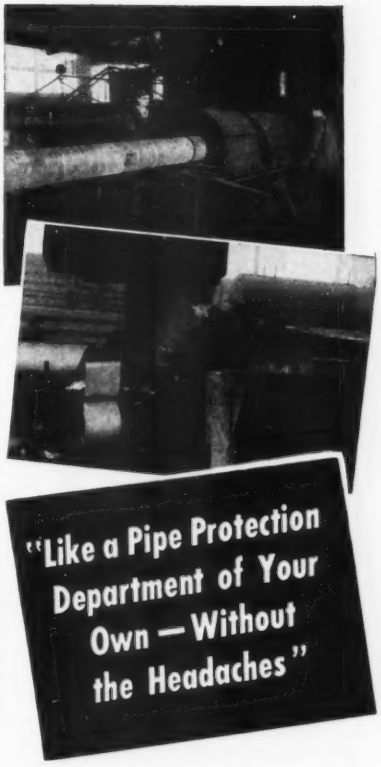
The H. C. Price organization will construct the 30-in. line with two spreads which will be supervised by C. S. Le Noir, superintendent. All of the welding for California sections of the project will be welded by the electric-arc method. However, the sections east of Blythe, on the California-Arizona boundary are to be constructed by El Paso Natural Gas Co. which will use pressure welding extensively; one spread in these El Paso Natural sections is to be laid by Midwestern Constructors.

Preliminary work along the right-of-way is to be started by H. C. Price crews in October. The laying of pipe will not begin before January 1, 1947. Heaviest types of equipment will be used but it will not be necessary to procure heavier than those currently utilized for large-diameter lines.

Panhandle Eastern's Suit Against Parish Reopened

WICHITA, Kans.—Panhandle Eastern Pipe Line Co.'s suit against its former president, Frank P. Parish, for an estimated $500,000 was scheduled to be resumed here this week before Federal District Judge Arthur J. Mellott.

Panhandle Eastern claims Parish, Taneytown, Md., and his wife, also a defendant, converted to their own use the proceeds of two sales of common stock in Missouri-Kansas Pipe Line Co. in 1930. The company is



When you give Pipe Line Service a job of coating and wrapping pipe, you have the close cooperation that you'd expect only from a department of your own, without any of the headaches of equipment and personnel.

These experienced pipe protection specialists offer you a complete service at six strategically located plants that relieves you of all responsibility. You simply select the specification you want and Pipe Line Service does the rest.

Find out today how much *more* Pipe Line Service gives you for your pipe protection dollar.

COMPLETE SERVICE
Through Strategically Located Plants
- Coating and Wrapping
  At the Mill
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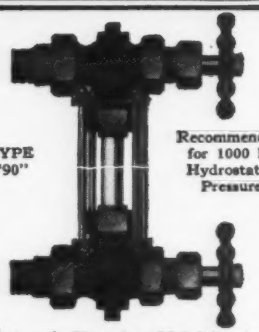
PIPE LINE SERVICE CORPORATION
PIONEERS IN STEEL PIPE PROTECTION
General Offices and Plant • FRANKLIN PARK, ILL.
Plants at Glenwillard, Pa. • Longview, Texas
Corpus Christi, Texas • Harvey, Louisiana

PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



TYPE "90"

Recommended for 1000 lb Hydrostatic Pressure

Made of Chromium-Molybdenuin alloy temperature resisting steel, extra heavy throughout and stainless steel trimmed. Positive automatic shut-off; stainless steel balls shut off the flow of liquid if glass breaks. Regrinding removable seats, heavy duty stuffing boxes, union connections. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

PIPELINE PERFECTION
IS THE RESULT OF
80 Years EXPERIENCE
AMONG OUR THREE KEY MEN
and
90% NEW AND MODERN
Efficient EQUIPMENT
A CONTRACT WITH MB MEANS "PIPELINE PERFECTION"

MORRISON BROS. CONSTRUCTION COMPANY INC.
GENERAL PIPELINE CONTRACTING
P.O. BOX 384 ODESSA, TEX. PHONE 1640

asking a judgment for $281,896 with interest from 1930.

Judge Mellott heard arguments on a motion in the case last week and then continued the hearing. A judge in state district court where the suit was first filed in December 1944, authorized attachment of producing properties and leases held by Parish in Grant County, Kansas.

Phillips Buys Denver Site For New Products Terminal

DENVER.—Phillips Petroleum Co. has purchased a 40-acre tract near Denver as the location of a terminal for its projected 365-mile products pipe line from the Texas Panhandle.

The terminal is located 6 miles north and 3 miles east of Denver's city limits. Phillips paid about $22,000 for the site, and will spend approximately $100,000 for improvements, according to reports here.

Earlier this month, Phillips bought a site at La Junta, Colo., for a booster station for the pipe line. The line, estimated to cost approximately $5,000,000, will extend from the Phillips refinery at Phillips, Texas, to Denver. Surveys for the line are now under way.

A statement by Phillips said the Denver terminal will provide storage for liquefied petroleum gases, butane, propane, motor fuels, and aviation fuels. Work on the terminal installations will begin as soon as materials are available.

Creole Plans Pump Stations At Ule and Dabajura

Some details of construction of Creole Petroleum Corp.'s projected La Salinas-Paraguana Peninsula crude oil pipe line were disclosed recently with the announcement by Cooper-Bessemer Corp. that it has received an order for engines for the line.

Twelve Cooper-Bessemer gas-diesel engines are to be used to furnish power for pumping stations at Ule and Dabajura. The other four units, supercharged LS diesels, will be located in the Amuay Bay power station to drive generators for loading pumps and for general electrical power.

Magnolia Contracts Work In Texas and Oklahoma

Magnolia Pipe Line Co. let a contract to Bishop & Lock Construction Co. for taking up and reclaiming approximately 40 miles of 8-in. crude-oil pipe line from Maud to Stonewall, Okla.

Several sections of 8 and 10-in. pipe totaling approximately 15 miles south of Corsicana, Tex., have been in the process of reconditioning for Magnolia by O. C. Whitaker Co.

U. S. Officials to Consider Crude Line to California

A joint conference of representatives of the Commerce, Interior, Army, and Navy departments has been called in Washington by Gen. J. J. O'Brien, War Assets Administration deputy in charge of the disposal of the 24-in. crude oil and 20-in. products systems built by War Emergency Pipelines, Inc.

The purpose of the conference is to discuss the manner in which the interests and activities of these four government departments may be affected by the proposal of L. M. Glasco and associates, Dallas, to acquire WEP facilities for the purpose of removing pipe for relaying between West Texas and California for the transportation of crude oil.

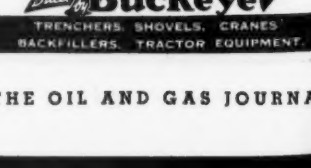
Pipe-Line Construction Company Incorporated

WICHITA FALLS, Tex. — A new pipe-line construction firm — Wright Construction Co. of Wichita Falls— has been granted a charter of incorporation by the State of Texas.

The company was incorporated by Bert C. Wright, Frieda I. Wright, and H. G. Collier, and succeeds a former partnership between Wright and George D. Fox. The company is capitalized at $25,000.

C. S. FOREMAN COMPANY
General Contractors
PIPE LINES
217 Railway Exchange Building
Kansas City 6, Missouri

BUCKEYE MODEL 11 for Speed and Economy on gathering, product and natural gas lines. Digs trench 11½" to 22" wide — up to 5' deep.



BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS, SHOVELS, CRANES
BACKFILLERS, TRACTOR EQUIPMENT

NATURAL GAS

A.G.A. Natural-Gas Group To Meet in Atlantic City

AN estimated 10,000 representatives of all phases of the gas industry, including many connected with natural gas, will converge on Atlantic City, N. J., October 7 for the 5-day annual convention of the American Gas Association.

The association's Natural-Gas Department will meet Monday, October 7, the first day of the convention. Several papers will be presented and election of members of the managing committee will be held.

A.G.A. officials are expecting the twenty-eighth annual convention in Atlantic City will be the largest and most significant ever held. Many postwar projects under way in the rapidly expanding gas industry are slated for discussion. In addition to meetings of the two major departments, Manufactured Gas and Natural Gas, sessions of the association's accounting, residential gas, industrial, and commercial gas, and technical sections will be held.

The association announced last week the time and place committee of the organization had decided to recommend that the 1947 convention be held September 29-October 3, 1947, in San Francisco. Approval of the recommendation by the Atlantic City convention is required, but tentative arrangements have been made to convene in San Francisco next year.

Among the main speakers for the general sessions is J. A. Krug, secretary of the interior. Krug will speak Tuesday, October 8, on "The Government and Business." A number of other talks on general business subjects are scheduled. The relation of the gas industry to the residential housing construction program will be discussed Thursday by Robert F. Gerholz, of Gerholz-Healey Co., Flint, Mich. Committee D-3 on gaseous fuels of the American Society for Testing Materials also has scheduled a meeting October 7 in Atlantic City.

The program for the meeting of the Natural Gas Department at 10 a.m. Monday in Cambridge Hall of the Claridge Hotel follows:

Opening remarks, R. H. Hargrove, vice president and general manager, United Gas Pipe Line Co., Shreveport, La., chairman.

Report of the nominating committee and election of managing committee members, J. French Robinson, president, East Ohio Gas Co., Cleveland, committee chairman.

Report of the time and place committee for the 1947 spring meeting, C. E. Bennett, president, Manufacturers Light & Heat Co., Pittsburgh, committee chairman.

Report, natural-gas reserves committee, N. C. McGowen, president, United Gas Pipe Line Co., Shreveport, committee chairman.

Report on a new research project—pipe-line flow—C. H. M. Burnham, vice president and chief engineer, Panhandle Eastern Pipe Line Co., Kansas City, Mo.

"Selling Natural Gas in Volume," an address by J. H. Gumz, manager, commercial and industrial sales, Pacific Gas & Electric Co., San Francisco, chairman of the department's large-volume sales committee.

"Recent Developments in Natural-Gas Regulation," an address by Charles I. Francis, Houston attorney.

Eastern Indiana Gas Asks Approval of Extension Plan

WASHINGTON.—The Federal Power Commission has announced receipt of an application from Eastern Indiana Gas Co., Indianapolis, requesting permission to extend its facilities to near Muncie, Ind., to receive additional supplies of natural gas from Panhandle Eastern Pipe Line Co.'s 18-in. gas-transmission pipe line extending across North Central Indiana. In addition, Eastern Indiana asked the commission to direct Panhandle to make the connection and furnish gas for distribution in Wayne, Rush, and Henry counties.

As an alternate to the construction requested, Eastern Indiana proposed that the commission determine that Indiana Gas & Water Co., Indianapolis, is a "natural-gas company" and direct Indiana Gas & Water to deliver gas, through its 8-in. connection with Panhandle's line, to Eastern Indiana Gas Co. at Newcastle, Ind.

Eastern Indiana told the commission it had been negotiating with Panhandle, but that Panhandle had refused to enter into a contract to supply the requirements of the Rushville division, although since 1945 it has been supplying gas to Eastern Indiana for use in the Fortville division.

Facilities requested by Eastern Indiana to allow connection with Panhandle's 18-in. line near Muncie include about 23 miles of 3-in. line. Cost is estimated at $83,812.

Louisiana Group Continues Gas-Proration Study

NEW ORLEANS.—Plans to prorate natural gas in Louisiana were given further study at a meeting here of a committee of gas producers and distributors with state officials.

The committee decided to redraft a proposal presented by technicians of the State Conservation Department and meet again in about 2 months. Exact details of the plan were not disclosed.

Joseph L. McHugh, state conservation commissioner, said he hoped a workable plan will be formulated soon for statewide gas proration and ratable take. P. A. Frye, director of natural-gas conservation, said it is proposed to draw up a statewide order for gas proration based on market demand similar to oil proration.

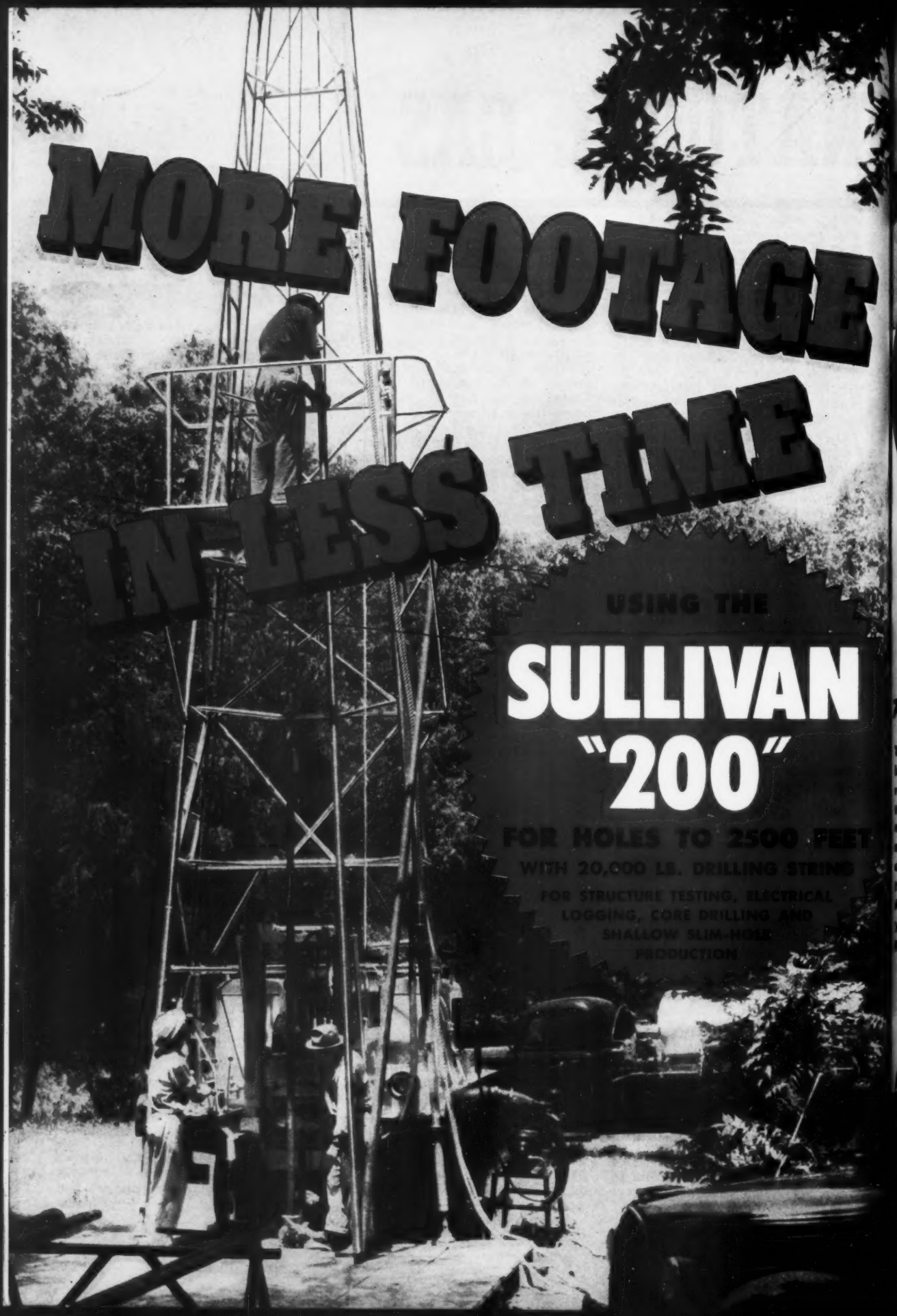
Northern Natural Plans Extensive Additions

WASHINGTON. — Northern Natural Gas Co. has applied to the Federal Power Commission for permission to make additions to its pipeline system extending from Texas through Oklahoma, Kansas, Nebraska, Iowa, Minnesota and South Dakota. Cost is estimated at $12,667,000. Also planned is an increase in capacity of the company's line north of Clifton, Kans., from 325,000,000 cu. ft. per day to 407,000,000 cu. ft. to meet anticipated demands during 1947-48.

Additional facilities include: Compressor stations at Sunray, Tex., of 1,800 hp., and Dunnell, Minn., of 3,200 hp. Compressor additions, at stations in Oklahoma, Kansas, Nebraska, and Iowa will total 34,200 hp. Loop line additions proposed total 150 miles of 24, 20 and 18-in. in Nebraska, Iowa and Minnesota.

Other construction planned includes about 35 miles of 16-in. line from the Sunray, Tex., compressor station to a main line in Hutchinson County, Texas; and an extension of a lateral line from Ames, Iowa, to serve Marshalltown, State Center, and Colo, Iowa; and a dehydration plant at Sunray and appurtenant equipment.

FPC recently announced issuance of a certificate of convenience and necessity authorizing Northern Natural to construct and operate six new compressor additions which will have the effect of increasing the company's total pipe-line capacity from 300,000,000 to 325,000,000 cu. ft. per day and the capacity into the Minneapolis-St. Paul, Minn., area from 82,000,000 to 89,500,000 cu. ft. per day.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IN LESS TIME
USING THE
SULLIVAN
"200"
FOR HOLES TO 2500 FEET
WITH 20,000 LB. DRILLING STRING
FOR STRUCTURE TESTING, ELECTRICAL
LOGGING, CORE DRILLING AND
SHALLOW SLIM-HOLE
PRODUCTION

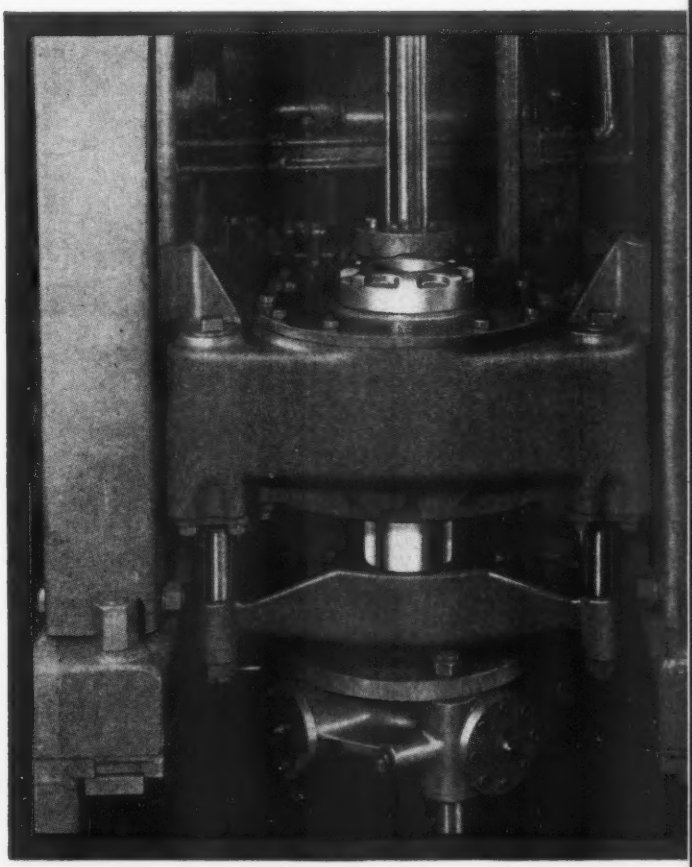
THE SULLIVAN "200" IS *Completely Portable*

A completely portable rig for exploratory drilling . . . that's the remarkable Sullivan "200"—the outstanding rig for high speed drilling at low cost. The entire rig, including the folding two-piece derrick, can be mounted on a truck, trailer, tractor or skids.

Featuring

AUTOMATIC *Hydraulic Chuck*

The Sullivan-developed Automatic Chuck is a key factor in the unsurpassed performance record of the "200" portable drill rig. It serves the triple purpose of rotary table, safety clamp and chuck when drilling without kelly. Besides saving labor, it increases drilling speed, lowers drilling costs and makes a definite contribution to greater safety. Once you see the Sullivan Automatic Chuck in action, you'll wonder how you were ever satisfied with former drilling performance! Write for descriptive bulletin.



Consult a Joy Engineer

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES, JOHN W. OLIVER BUILDING
PITTSBURGH, PA.

STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED SEPTEMBER 21, 1946

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	32	16	0	*16	43,167	1,144	1,053	0	0	0	0	0	0	0	0	0	0
Pennsylvania	76	40	4	†32	113,454	2,878	2,993	0	0	0	0	0	0	0	0	0	0
West Virginia	17	1	13	3	42,883	533	588	0	0	0	0	0	0	0	0	0	0
Ohio	34	10	14	10	85,074	887	673	0	0	0	0	0	2	0	12	27	41
Indiana	2	0	0	2	3,781	258	145	0	0	0	0	0	3	0	0	13	16
Kentucky	3	3	0	0	4,390	342	377	2	0	0	0	2	5	0	0	31	36
Illinois	80	38	2	40	203,458	1,642	1,293	3	0	0	24	27	36	0	1	319	356
Michigan	15	4	4	7	29,238	589	535	1	0	1	3	5	18	0	6	189	213
Kansas	42	23	9	‡10	127,797	1,427	1,236	1	0	0	4	5	23	0	1	186	210
Neb., Mo., Iowa	0	0	0	0	0	15	18	0	0	0	0	0	0	0	0	11	11
Oklahoma	62	29	7	‡26	175,541	1,962	1,748	1	0	0	9	10	62	0	29	240	331
Texas	146	89	8	49	640,229	5,755	5,185	6	2	2	27	37	158	23	24	949	1,154
North Central	56	32	2	22	148,787	2,066	1,578	2	0	2	8	12	49	0	4	391	444
West	33	21	0	‡12	178,159	1,241	1,300	3	0	0	7	10	39	0	1	133	173
Panhandle	6	2	4	0	17,881	235	402	0	0	0	0	0	0	0	0	5	5
Eastern	10	6	1	3	47,482	527	245	0	0	0	3	3	15	0	2	69	86
Gulf Coast	36	28	1	7	235,361	1,260	1,179	1	2	0	5	8	37	21	8	184	250
Southwest	5	0	0	5	12,559	426	481	0	0	0	4	4	18	2	9	167	196
Louisiana	27	15	3	9	122,290	980	753	0	0	0	4	4	41	8	7	135	191
Northern	22	12	3	7	70,706	551	297	0	0	0	3	3	8	0	2	77	87
Southern	5	3	0	2	51,584	429	456	0	0	0	1	1	33	8	5	58	104
Arkansas	7	3	0	4	27,168	131	127	1	0	0	3	4	6	0	0	29	35
Mississippi	6	3	0	3	32,474	176	266	0	0	0	2	2	1	0	1	49	51
Southeastern States	1	0	0	1	5,502	31	43	0	0	0	1	1	1	0	0	26	27
Montana	5	3	2	0	7,183	224	231	0	0	0	0	0	9	0	1	24	34
Wyoming	4	3	0	1	18,530	126	154	0	0	0	1	1	11	0	3	30	44
Colorado-Utah	5	5	0	0	32,615	108	36	0	0	0	0	0	4	0	0	12	16
New Mexico	9	9	0	0	38,887	274	305	0	0	0	0	0	3	0	0	28	31
California	10	6	0	4	52,710	1,190	1,681	1	0	0	4	5	18	0	4	159	181
Total United States	583	300	66	217	1,806,371	20,672	19,440	16	2	3	82	103	401	31	89	2,457	2,978
Total previous week	597	306	66	225	1,975,854	20,089	18,844	16	1	3	83	103	385	29	86	2,375	2,875
Total Sept. 22, 1945	596	308	67	221	2,068,423			8	1	4	77	90	377	18	107	2,475	2,977

Service wells included: *16, †31, ‡1.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$1.17			....
19-19.9	1.21		$1.41	....
20-20.9	1.24	$1.20	1.43	1.07
21-21.9	1.28	1.22	1.45	1.09
22-22.9	1.32	1.24	1.47	1.11
23-23.9	1.35	1.26	1.49	1.13
24-24.9	1.39	1.28	1.51	1.15
25-25.9	1.43	1.30	1.53	1.17
26-26.9	1.46	1.32	1.55	1.19
27-27.9	1.50	1.34	1.57	1.21
28-28.9	1.54	1.36	1.59	1.23
29-29.9	1.57	1.38	1.61	1.25
30-30.9	1.61	1.40	1.63	1.27
31-31.9	....	1.42	1.65	1.29
32-32.9	....	1.44	1.67	1.31
33-33.9	....	1.46	1.69	1.33
34-34.9	....	1.48	1.71	1.35
35-35.9	....	1.50	1.73	1.37
36-36.9	....	1.52	1.75	1.39
37-37.9	....	1.54	1.77	1.41
38-38.9	....	1.56	1.79	1.43
39-39.9	....	1.58	1.81	1.45
40 and above	....	1.60	1.83	1.47

*Includes Lea County, New Mexico.

(Quotations shown here are f.o.b. plant in tank cars and in cents per gal. as of last Monday. Crude prices reflect latest 25-cent advance except in California and Pennsylvania where no increase had been made as of Monday morning, July 29.)

REFINERY GASOLINE

Octane (A.S.T.M.)	78-78½†	73-75
Mid-Continent*	7.500-7.750	6.875-7.000
Tex. Gulf Coast	7.250	6.500-6.750
New York Harbor	8.750-9.500	7.750-8.500
California		7.000-7.875

*Basic Oklahoma Group 3. †1939 C.F. R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	4.500	5.400
N. Texas (f.o.b. plant)	4.000	4.800
N. Louisiana (f.o.b. plant)	4.250	5.100
California (averages)	5.500	6.250

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.60
Kettleman Hills, California*	1.69
Beauregard Parish	1.55
Illinois Basin	1.72
Pecos County, Texas	1.30
Bradford, Pennsylvania	3.41
Eastern Ill., and Western Ind.	1.57

Note: Exclusive of subsidy.
*For 37-37.9 gravity.

A.P.I. REFINERY REPORT

Week ended September 14, 1946
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks—Gasoline	Stocks—Distillate	Stocks—Residual
East Coast	799	21,597	20,074	11,790
Appalachian	155	3,082	710	503
Ill., Ind., Ky.	818	15,548	8,205	5,272
Okla., Kan., Mo.	374	8,174	3,475	1,403
Inland Texas	208	2,600	575	691
Tex. Gulf Cst.	1,180	12,663	7,710	6,615
La. Gulf Cst.	337	4,671	3,099	1,793
No. La., Ark.	52	1,415	553	194
Rocky Mtn.	151	1,426	560	776
California	818	15,642	11,243	26,699
Total 9-14-46	4,892	86,818	56,204	55,736
Total 9- 7-46	4,881	86,911	54,721	54,786
Total 9-15-45	4,565	83,433	44,531	48,895

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
September 14, 1946	221,903,000
September 7, 1946	223,132,000
September 15, 1945	214,480,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 21 crude oil	B. of M. Sept. demand	Sept. 14 crude oil
Alabama	1,050	1,200	1,050
Arkansas	78,100	78,000	79,100
California	867,500	855,000	869,100
Colorado	35,580	31,000	36,640
Eastern	67,500	65,000	64,000
Florida	100	200	100
Illinois	202,900	214,000	202,850
Indiana	19,400	19,000	19,400
Kansas	277,800	264,000	271,000
Kentucky	31,100	31,000	31,150
Louisiana	398,300	384,000	398,500
North Louisiana	94,300	.....	94,500
South Louisiana	304,000	.....	304,000
Michigan	45,949	47,000	52,530
Mississippi	74,750	61,000	73,100
Montana	24,720	24,000	25,910
Nebraska	700	800	750
New Mexico	99,400	100,000	99,400
Oklahoma	353,550	386,000	352,150
Texas	2,088,400	2,120,000	2,088,400
District 1 (Southwest)	19,400	.....	19,400
District 2 (Southwest)	148,400	.....	148,400
District 4 (Southwest)	220,000	.....	220,000
District 3 (Gulf Coast)	464,850	.....	464,850
District 5 (Eastern)	41,000	.....	41,000
District 6 (Eastern)	103,500	.....	103,500
East Texas Field	326,000	.....	326,000
District 7C (West)	27,200	.....	27,200
District 8 (West)	491,200	.....	491,200
District 7B (W. Central)	32,850	.....	32,850
District 9 (N. Central)	129,000	.....	129,000
District 10 (Panhandle)	85,000	.....	85,000
Wyoming	108,470	108,000	110,790
Miscellaneous other	.....	800	.....
Total United States	*4,775,269	4,790,000	4,775,920

Change from prev. week, down 651

Total production January 1-September 21..... †1,251,881,390 bbl.
Same period last year (crude, plus condensate) 1,268,518,225 bbl.
*Not incl. 22,200 bbl. condensate. †Incl. 6,418,600 bbl. condensate.

CRUDE-OIL STOCKS 221,903,000 bbl. as of September 14—down 1,229,000 bbl. One year ago 214,480,000 bbl.

GASOLINE STOCKS 86,818,000 bbl. as of September 14—down 93,000 bbl. One year ago 83,433,000 bbl.

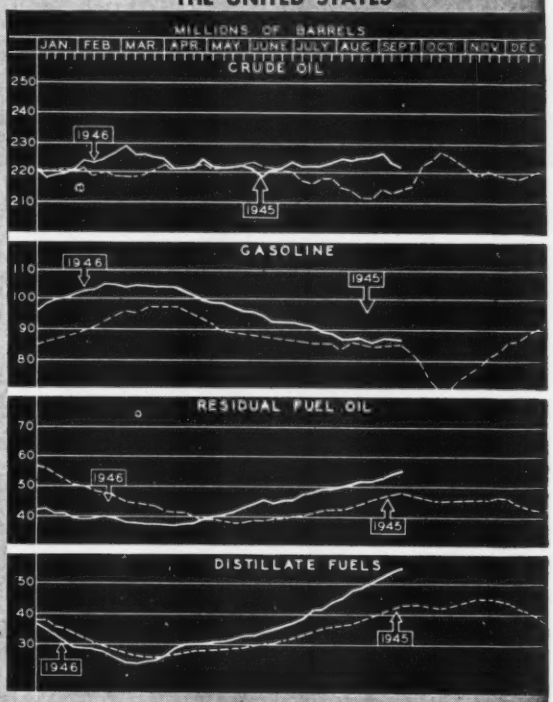
RESIDUAL FUEL-OIL STOCKS 55,736,000 bbl. as of September 14—up 950,000 bbl. One year ago 48,895,000 bbl.

GAS OIL AND DISTILLATE STOCKS 56,204,000 bbl. as of September 14—up 1,483,000 bbl. One year ago 44,531,000 bbl.

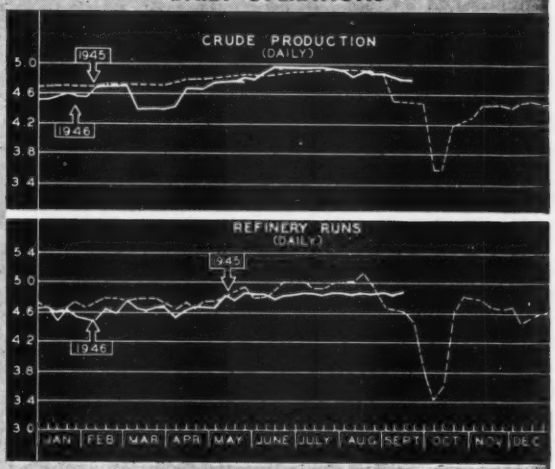
CRUDE-OIL PRODUCTION 4,775,269 bbl. as of September 21—down 651 bbl. One year ago 4,537,350 bbl.

REFINERY RUNS 4,892,000 bbl. daily week ended September 14—up 11,000 bbl. One year ago 4,565,000 bbl.

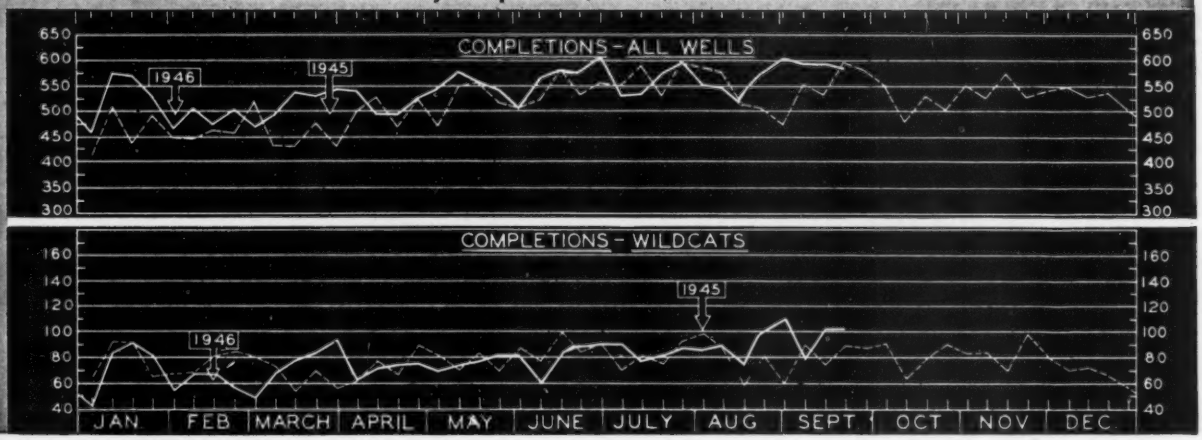
OIL STOCKS IN THE UNITED STATES



DAILY OPERATIONS



Solid line charts weekly completions, service wells in Eastern area included



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Exploration and Drilling

Exploration Around Gulf of Mexico

BEFORE getting too pessimistic about the future oil prospects of the United States, it might be a good idea to take a look at some of the areas where numerous oil companies are spending substantial sums of hard-earned money in geological and geophysical exploration on a sizable scale. Oil-company executives are not in the habit of spending large sums of money for this type of work, except on the basis of convincing evidence from their geological staff that there is a good prospect of making a profit.

Petroleum geologists consider that in a broad sense, the whole area around the Gulf of Mexico and the Caribbean Sea constitute one geological province. This province has produced vast quantities of oil from numerous areas around the rim. You can start at Corpus Christi for convenience, and it makes little difference whether you go north or south around the circle, north and east through Houston, down through Florida to Trinidad, Venezuela, Colombia, and back through Tampico, Mexico; you find oil and lots of it at numerous places. Of course there are places along the rim where the sedimentary section is absent, or too thin, or generally unfavorable, but these are local conditions.

At present within the United States, large sums of money are being spent in exploration proceeding in a logical manner eastward from known oil in Louisiana and Mississippi and down through Florida. Of course developments in Venezuela and Colombia right now speak for themselves, but plenty of oil is still being found in the western portion of the part of this circle that lies in the United States, from Brownsville to New Orleans. Meantime the exploration work goes ahead on the eastern part of the United States coast, and local geological regions are being worked out.

Certainly the prospects in the Apalachicola Embayment of south Georgia and west Florida, with a 15,000-ft. section of clastic sediments, must look good, judging from a geological and geophysical activity. The southern Florida embayment with a nonclastic, predominantly lime section of 20,000 ft. has already turned up one oil field, small, but who knows what will be found in the future?

In working east, the play has already spread to the Bahamas east of Florida, where there is reason to expect at least a 10,000-ft. sedimentary section. At this time, for instance, two large companies are carrying on expensive geophysical work in shallow water around the Bahamas. One is doing gravimeter work, using the latest techniques in diving bells and radar-equipped boats. Another has a fleet of boats, especially equipped to do seismograph work over water. Both are expensive exploration jobs.

On land in southern Florida, a lot of money is being spent to work out new techniques to solve the problems of getting good seismograph results. More money is being spent on deep wildcats in the same area, partly in the hope of being lucky enough to hit oil with these tests, partly for geological information that is confidently expected ultimately to lead to oil fields.

On a basis of judging opinions from the way they spend their money, a lot of geologists have convinced their managements that much oil is going to be found along the United States' eastern half of the Gulf of Mexico rim. It is quite likely that time will prove them to be correct; it usually has in the past.

MICHIGAN

Fifteen Completions Reported In Michigan During Week

SAGINAW.—While reporting 19 new locations, Michigan oil and gas operators completed 15 other drilling operations in the past week for 4 oil wells, 4 gas wells and 7 dry holes.

The producers included a wildcat acidized for 35 bbl. a day in Crystal Township, Oceana County. The well, Charles W. Teater 2 Ryan in Section 16 was drilled to 3,843 ft., plugged back to 1,866 ft. for Traverse limestone production.

Another wildcat completion was a gas well in Rolland Township, Isabella County. The four gas wells, all in Lincoln Township, Section 17, Clare County, are Michigan Consolidated Gas Co. projects. Combined initial was 42,300,000 cu. ft.

Of new oil potential 3,120 bbl. was from another Arenac-Deep River well. Small wells also were completed in Allegan and Van Buren counties. Among dry holes was Pure Oil Co. 1 Mulder in Section 18, Garfield Township, drilled to 5,124 ft.

The new locations are in 12 counties—four in Allegan, three in Bay, two each in Ottawa and Osceola, one each in Kent, Van Buren, Livingston, Eaton, Mecosta, Ogemaw, Tuscola, and Muskegon.

MICHIGAN SUCCESSFUL WILDCATS

Isabella County, Rolland Township: West Michigan Consumers Co. 1 Zoll-Cooper, C 29-13n-6w, gas well, 1,200,000 cu. ft., TD 1,282 ft.

Oceana County, Crystal Township: Charles W. Teater 2 Lulu Ryan, SE NE NW 16-16n-16w, pumped 35 bbl., acidized, in Traverse limestone, TD 3,843 ft., plugged back to 1,866 ft.

MICHIGAN WILDCAT FAILURES

Arenac County, Mason Township: Arenac Oil & Gas Co. 1 State-Mason, C SW 31-20n-5e, dry, TD 1,624 ft.

Newaygo County, Barton Township: Panhandle Eastern Pipe Line Co. 2-2 Remington, C SE 3-16n-11w, dry, TD 1,387 ft.

Van Buren County, Geneva Township: Walter A. Elliott 1 J. Schwartz, NW NE SE 18-1s-16w, dry in Traverse limestone, TD 1,052 ft.

CANADIAN FIELDS

Important New Gas Field Found in Pinhorn Area

CHATHAM. — Opening of an important new gas field in the Pinhorn area of southern Alberta, close to the Montana boundary, is indicated by the results of recent joint tests by McColl-Frontenac Oil Co. and Union Oil Co. McColl-Union 9-A, LSD 9, 22-3-8w4, the discovery well, is officially reported to have a measured flow of 48,058,000 cu. ft. daily from the Bow Island sand series of the Colorado formation. Originally drilled to the Madison, it was plugged back and casing perforated to test the main sand at 2,013-46 ft. McColl-Union 4-B, LSD 4, 16-3-8w4, finished at 2,201 ft. with 7-in. set at 2,015 ft., has been shut in with gas flow around 8,000,000 cu. ft. McColl-Union 7-C, LSD 7, 6-4-8w4, is drilling.

Stolberg.—In the Stolberg area of the Central Alberta foothills, Imperial-Shell-Stolberg 1, LSD 3, 22-41-14w5, finished at the record depth of 13,747 ft., has plugged back after testing the lower porous zones of the Madison limestone. Casing is being perforated to test the slightly porous upper zones.

Turner Valley.—In the old south Turner Valley field, the cleaning out of West Flank 2, LSD 8, 32-18-2w5, scene of the experimental "big shot" last February, has indicated negative results. The experiment, carried out by Oil Well Reflow, Ltd., at an estimated cost of $100,000 up to and including the shot and $50,000 to clean out the hole, was designed to crack vertically the oil-bearing limestone and release previously shut off oil reserves. West Flank 2, completed in 1938 at 6,973 ft., had 666-bbl. initial recovery from the Madison limestone at 6,542-6,958 ft. but was practically off production prior to the shot. Some 5,000 quarts of nitroglycerin were used, forming a bridge, which was only recently drilled out. The Petroleum and Natural Gas Conservation Board reports

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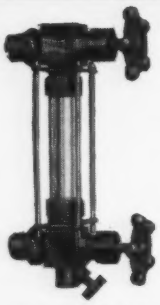

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that 10 bbl. of water daily are being recovered from the hole.

Ram River.—On the Ram River-Clearwater structure in the central Alberta foothills, Ram River Oils 3, LSD 12, 1-37-11w5, has considerable light crude in the redrilled hole, bottoming around 2,949 ft. While tubing was being pulled, the well flowed 26 bbl. without lowering the oil level. Pumping equipment is being installed for a test. Ram River 4, LSD 9, 36-34-10w5, is preparing to acidize at 1,460 ft.

Lloydminster.—Husky Refining Co. which is planning erection near Lloydminster of a refining plant specially designed to handle the heavy crudes of that field, has secured from the Alberta government a reservation on 135,040 acres together with 19,000 acres from the C.P.R. The holdings extend from the Vermilion field east to the Saskatchewan boundary, and from the Great Bend wells on the north to within 12 miles of the Wainwright field on the south. Arrangements have been made with the Saskatchewan government for acreage in that province east of the Alberta holidays; and the company is planning systematic development.

In the Saskatchewan end of the field, Lloydminster Gas 6, LSD 13, 24-49-28w3, finished at 1,871 ft., is officially reported to have developed a flush production of 80 bbl. an hour, but settled rapidly to around 20 bbl. or between 200 and 250 bbl. a day. The well had to be shut down owing to lack of facilities to handle the output. The previous largest Saskatchewan producer was 140 bbl. a day. Community Services 20, 1½ miles from the main field in Saskatchewan, has completed drilling with a good producer indicated. Eight miles west of Lloydminster, on the Alberta side, Lloydminster Oil Producers 3, LSD 13, 11-50-2w5, standing cemented at 1,998 ft., looks like a good well, opening another extension in that direction.

EASTERN TEXAS

Two More Offsets Started To Mount Sylvan Discovery

DALLAS.—Humble Oil & Refining Co. 1 Moseley, D. Martin Survey, northeast-diagonal offset to the discovery well in the Mount Sylvan pool of northern Smith County, topped the Paluxy sand at 7,365 ft. with elevation of 477 ft. It was cored from 7,370-89 ft. and recovered 13 ft. of porous oil sand, the balance being shale. Operator was coring ahead.

Two more offsets have been started. One is Humble 2 T. J. Pool, William Saunders Survey, 660 ft. from the west line and 1,980 ft. from the north line of a 242.6-acre tract. The other is 2 Moseley, D. Martin Survey, 1,100 ft. west of 1 Moseley. It is 660 ft. from the west line and 1,800 ft. from the north line of a 97-acre tract.

Magnolia Petroleum Co. 1-A Southern Pine Lumber Co., Leonard Williams Survey, 10 miles north of Kennard, Houston County, entered the Woodbine at about 5,960 ft. with elevation of 351 ft. A 35-minute drill-stem test from 5,956-86 ft. was run, and 1,200-ft. water cushion, 450 ft. of gas-cut mud and 3,100 ft. of salt water were recovered. It was drilling ahead. John S. Ivy and W. T. Moran 3 G. L. Murray & Sons, John Durst Survey, Abstract 29, Houston County wildcat 4 miles southwest of Creek, cored Wilcox sand from 4,771-4,807 ft. It was drilling ahead and will be carried to the Woodbine.

J. V. Fleming 1 Mary Ward, P. Varela Survey, 14 miles southwest of Mexia, Limestone County, was reported making oil by heads through ½-in. choke from Woodbine perforations opposite the sand sections from 2,864-78 and 2,970-70 ft. If successful, this venture might open a small pay area on the southwest flank of the old Cedar Creek field.

Talco field, Franklin and Titus counties, had two completions this week. Long Lake field, Anderson County, and Hawkins and Manziel fields, Wood County, each had one. New Hope field, Franklin County, Whelan field, Harrison County, Henderson field, Rusk County, and Sand Flat field, Smith County, each had one location. Carthage field has 27 drilling wells; Hawkins field, 6; Opelika field, Henderson County, 5; Tri-Cities field, Henderson County, Waskom field, Harrison County, and Talco field each have 4.

EASTERN TEXAS WILDCAT FAILURES

Cherokee County: Delta Drilling Co. 1 Southern Pine, Z. Gibbs Sur., 8 mi. W Alto, elev. 313 ft., Austin chalk 4,978 ft., Woodbine 5,203 ft., dry, TD 5,255 ft.

Hunt County: K. L. Henry 1 Hoyle Neely, J. E. Clark Sur., 3 mi. SE Caddo Mills, Travis Peak 5,230 ft., dry, TD 5,347 ft.

Kaufman County: Humble 1 Lon Hale, J. S. Ables Sur., 1 mi. N Kemp, elev. 409 ft., Pettit 6,169 ft., Travis Peak 6,250 ft., dry, TD 6,475 ft.

PERMIAN BASIN

Southwestern Andrews Test Rated Prospective Discovery

MIDLAND.—Humble Oil & Refining Co. 1-B R. B. Cowden, Section 11, Block 45, T-2-N, T&P Survey, is a prospective discovery 2 miles northeast of the Goldsmith-Devonian pool and 2¾ miles southwest of the Embar field in southwestern Andrews County.

A 75-minute drill-stem test was run from 8,546-80 ft. in the Ellenburger. There was gas to the surface in 7 minutes, estimated at 240,000 cu. ft. daily. It unloaded a small head of oil in 8 minutes, then made oil and gas for 30 minutes. Recovery was 104 bbl. of dark green pipe-line oil. The oil tested 40.1° gravity. Flowing pressure was 400 to 1,300 lb., and shut-in pressure after 15 minutes, 3,450 lb. The well will be deepened and tested again.

Humble 1-C R. B. Cowden et al, Section 3, Block 45, T-2-N, T&P Survey, 1½ miles west and 1 mile north of the Goldsmith-Devonian pool, ran a 90-minute drill-stem test from 7,940-8,084 ft. There was a slight blow of air during part of the test. Recovery was 79 ft. of drilling mud with no show and 90 ft. of slightly oil-cut mud.

Humble 1 Mary E. Turner, Section 43, T-2-S, W. T. Holcombe Survey, 2 miles south of the Midland pool, Midland County, took a 77-minute drill-stem test from 8,497-8,584 ft. in the Permian. There was sweet gas to the surface in 30 minutes. Recovery was 45 ft. of 38°-gravity oil and 160 ft. of oil and gas-cut mud. It was drilling ahead.

Warren Petroleum Co. and Humble 1 J. T. Hamilton, Section 275, Block 1-A, H&TC Survey, Coke County wildcat 3½ miles northwest of Ft. Chadbourne, on a 60-minute drill-stem test of the Ellenburger, topped at 6,365 ft., recovered 20 ft. of oil-cut mud.

Stanolind Oil & Gas Co. 1-GG University, Section 12, Block 39, University Lands, Ellenburger prospect 24 miles northeast of the Todd Deep pool in northeastern Crockett County, recovered 1.89 bbl. of new oil per hour on the swab for a 7-hour period. The test was plugged back to 8,364 ft. from 8,384 ft. and acidized with 1,000 gal. Operator was preparing to drill out approximately 5 ft. of the cement plug. One-half mile north of 1-GG University, Stanolind will drill 1-TT University. It is 2,060 ft. from the north line and 660 ft. from the west line of the north half of Section 12. Moore Exploration Co. 1 Mrs. Maggie Schneeman, Section 2, D. L. Carver Survey, small discovery 5 miles northeast of

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the World pool, Crockett County, tested about 20 bbl. of oil daily with no water after treating with 2,000 gal. of acid in open hole between 2,232-2,392 ft.

Fullerton field, Andrews County, had three completions this week and Taylor-Link field, Pecos County, and Slaughter field, Hockley and Cochran counties, each had two. Fullerton field, Shafer Lake field, Andrews County, and Slaughter field, Hockley County, each had three locations. TXL field, Ector County, has 35 drilling wells; Fullerton field, 26; Block 12 field, Andrews County, 22; Keystone-Ellenburger field, Winkler County, 18; Todd Deep field, Crockett County, 7; North Goldsmith field, Ector County, Monahans North field, Ward and Winkler counties, and Wheeler-Ellenburger field, Wikler and Ector counties, 6; and Russell field, Gaines County, and Keystone-Colby field, Winkler County, each 5.

WEST TEXAS SUCCESSFUL WILDCATS

Andrews County: New oil pool—Placid & Gulf 1 Thornberry, Sec. 5, Blk. A-42, PSL Sur., 2 mi. W Fuhrman pool, elev. 3,255 ft., pumped 33 bbl. day. perf. 11,945-55 ft. Ellenburger, gravity 40.2°, TD 11,959 ft.

Extension to old oil pool: Superior 3-12-A University, Sec. 22, Blk. 12, University Lands, 1 mi. S discovery well Block 12 pool, elev. 3,285 ft., top pay 7,065 ft., flowed 736 bbl. day at 7,219 ft. Clearfork, gravity 31.6°, TD 7,245 ft.

Winkler County: Extension to old oil pool —Ralph Lowe 1 Sealy-Smith Foundation, Sec. 71, Blk. A, G&MMB&A Sur., 3 mi. NE Sealy-Smith pool, elev. 2,746 ft., flowed 300 bbl. day through perf. from 5,220-80 ft. Glorietta, gravity 34.8°, gas-oil ratio 1,200 to 1, TD 6,500 ft.

WEST TEXAS WILDCAT FAILURES

Coke County: Harley Sadler 1-39 Bob Mims, Sec. 39, Blk. W, T&P Sur., 11 mi. NW Water Valley, elev. 2,366 ft., dry in Clearfork, TD 2,100 ft.

Crockett County: H. W. Snowden 1 J. S. Sorg et al, Sec. 59, Blk. BB, GC&SF Sur., elev. 2,732 ft., dry, TD 2,662 ft.

Kent County: American Liberty Oil Co. 1 Connell & Young, Sec. 56, Blk. 5, H&GN Sur., 1 mi. NW discovery well Polar field, elev. 2,271 ft., Ellenburger 7,780 ft., dry, TD 7,925 ft.

Pecos County: G. F. Aldrich 2 State National Bank, Sec. 25, Blk. 140, T&St. L. Sur., 2 mi. SW Masterson pool, elev. 2,486 ft., Ellenburger 4,592 ft., dry, TD 4,643 ft.

Frank Brock 1 I. G. Yates Est., Sec. 71, Blk. 1, I&GN Sur., 1½ mi. NE Toborg pool, elev. 2,231 ft., Yates 1,750 ft., dry, TD 2,060 ft.

Debs Patillo 1 J. L. McMurtry, Sec. 62, Blk. 10, H&GN Sur., 2 mi. S Lehn pool, elev. 2,465 ft., dry, TD 1,653 ft.

Runnels County: H. W. Snowden 1 E. C. Grindstaff, Sec. 333, E. W. Bull Sur., 6½ mi. S Mario, elev. 1,763 ft., Caddo 4,050 ft., dry, TD 5,357 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Pure Oil Co. 1 Federal, 31-3n-38e, De Baca County wildcat 13 miles east of Fort Sumner, was dry in granite topped at 6,450 ft. The test was drilled to 6,468 ft. Abo was topped at 4,000 ft. and based at 5,085 ft. Pennsylvanian was entered at 5,165 ft. Magnolia Petroleum Co. et al 1 Black Hills unit, 31-17s-20e, Chaves County wildcat 25 miles west of Artesia, had reached 3,988 ft. in dolomite and shale.

Neil Wills has staked a wildcat 1 mile east of the Hale field in east central Eddy County. It is 1 Crosby, 990 ft. from the north line and 330 ft. from the west line of 7-20s-31e. It is scheduled to explore 2,100 ft. Grayburg Oil Co. 10-A Keely, 24-17s-29e, deep wildcat in the Grayburg-Jackson shallow field in north central Eddy County, had passed 6,873 ft. in unidentified lime. This test is being drilled "tight."

Humble Oil & Refining Co. 4-B Hardison, 34-21s-37e, a north extension to the Brunson field in east central Lea County, was completed for 642 bbl. of pipe-line oil daily through a ½-in. tubing choke. Completion was through perforations above 6,584 ft. Gas-oil ratio was 872-1. Texas Pacific Coal & Oil Co. 16-A State, 11-23s-36e, midway between the Cooper-Jal and Penrose-Skelly fields, has been completed as a gas well. It flowed 4,186,000 cu. ft. of gas daily through 2-in. tubing set at 3,538 ft.

Caprock field, Chaves County, has 2 completions and Brunson field, Lea County, had 1. Drinkard and Brunson fields each had 2 locations. Drinkard field has 16 drilling wells; Grayburg-Jackson field, Eddy County, 12; Paddock field, Lea County, 11; Square Lakes field, Eddy County, 7; Brunson field, 6; Langlie-Mattix field, Lea County, 5, and Cooper Jal field, Lea County, and Maljamar and Russell fields, Eddy County, 4.

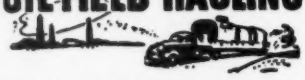
TEXAS GULF COAST

New Gas-Condensate Pay Found in Tide Haven Pool

HOUSTON.—A new gas-condensate pay has been opened in Tide Haven pool, Matagorda County, by Ralph A. Johnston 1 Live Oak Farms, in Josiah Tilley League, 2 miles northeast of Blessing. Drilled to a total depth of 9,002 ft., test gaged an estimated 184 bbl. of condensate per day and 3,681,000 cu. ft. of gas through 60 perforations from 8,756-72 ft. Gas-condensate ratio 20,000-1, tubing pressure 2,510 lb., gravity 52°, no water.

O. J. Martin 1 H. B. McCrary et al, wildcat test 2 miles southwest of production in the Clodine field, in the James Knight and W. C. White Survey, is cleaning into pits and tanks are being built on location

OIL-FIELD HAULING



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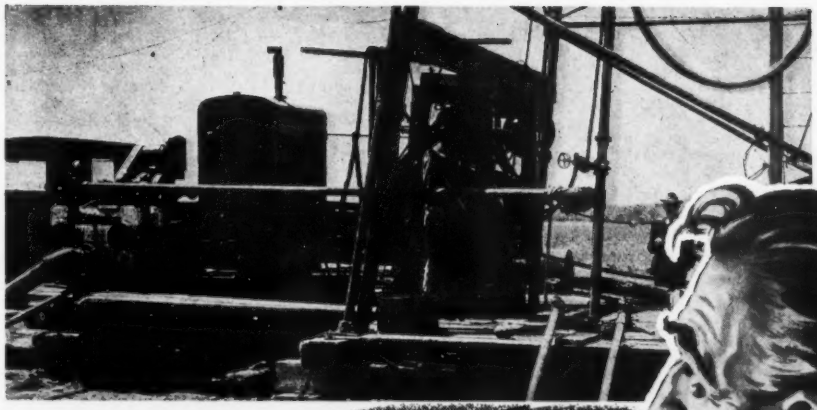

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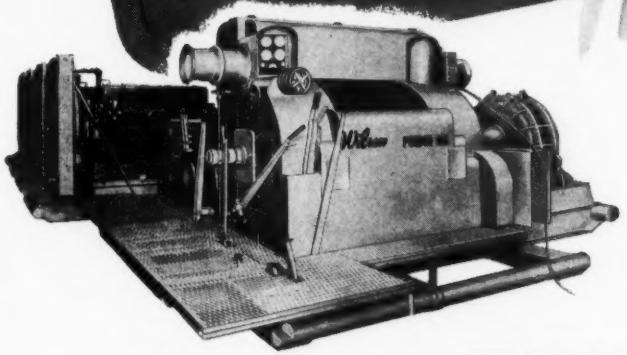

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for a gage of production. Test is flowing oil with slight amount of mud, no water, through perforations in the upper sand from 7,320-28 ft. On previous drill-stem test, 13 stands of clean oil, 41° gravity, were recovered.

A new gas-producing sand for the Hutchins-Lakeview area, Wharton County, has been opened by W. A. Clark, Jr. at 1 Anna Tobola Estate, I&GN Survey, Abstract 236. Perforations for completion were made with 10 shots from 4,796-4,806 ft. Gas volume has not been gaged, but was flowing through a ⅛-in. choke with 1,420-lb. flowing pressure on the tubing, and a shut-in pressure of 1,640 lb. Total depth is 5,015 ft., and 5½-in. casing is cemented at 4,853 ft.

A new oil field for Orange County is indicated at Hinkle Drilling Co. 1 G. M. Adcock, wildcat test more than 8,000 ft. northwest of Miocene-sand production on the Port Neches dome, on an 80-acre lease in the John Stephenson Survey, Abstract 169. A total of 120 ft. of sands in four seperate sections were found, top sand being topped at 8,578 ft., 1,800 ft. in the Frio formation. The last sand is bottomed at 8,790 ft. After drilling to a total depth of 8,954 ft., log was run, and sidewall samples taken of the sands indicated. The first sand showed mostly gas but had good oil odor. Production string will be run to approximately 8,900 ft.

Provident City field in Lavaca County near the Colorado County line, has been extended 6,300 ft. northeast by Shell Oil Co., Inc., 1 H. N. Schwartz. This well is producing from the Wilcox zone and gaged 70 bbl. of condensate per day, with 3,170,000 cu. ft. of gas, through a ⅛-in. choke, through perforations from 8,640-60 ft., and 8,693-8,736 ft. Tubing pressure was 2,310 lb., and casing pressure 2,390 lb.

McCoy field of Liberty County, has been extended 3,000 ft. east by Shell 1-A B. E. Quinn, in Daniel Donahoe Survey. Drilled to a total depth of 9,158 ft., it gaged 706 bbl. of 32°-gravity pipe-line oil in 24 hours, after acidization, through a ⅛-in. choke, with 1,350-lb. flowing pressure on the tubing and 1,675 lb. pressure on the casing. Gas-oil ratio 603-1. Production is through 40 perforations from 9,112-24 ft.

There were 16 new locations reported this week, 5 being wildcats, 2 in Brazoria, 1 each in Jackson, Jefferson, and Liberty counties. Brazoria County received 3 new locations while Matagorda, Jackson, and Polk received 2 each. The 16 completions included 3 wildcats, 1 successful gas-condensate pay in Matagorda, and 2 dry holes, 1 each in Austin and Wharton counties. Matagorda County, received the greatest activity with 3 producers completed; Liberty and Polk counties each received 2 completions.

UPPER GULF COAST SUCCESSFUL WILDCAT

Matagorda County: New gas-condensate pay, Tide Haven pool—Ralph A. Johnston 1 Live Oak Farms, Josiah Tilley League, 2 mi. NE of Blessing, TD 9,002 ft., perf. 60 holes 8,756-72 ft., PT estimated 184 bbl., condensate per day and 3,681,000 cu. ft. gas per day, gas-condensate ratio 20,000 to 1, TP 2,510 lb., gravity 52°, no water.

UPPER GULF COAST WILDCAT FAILURES

Austin County: Pure Oil Co. 1 Willie Stepan, in Welcome area, Eliz. M. Kuykendall Sur., Abst. 60, dry, TD 11,005 ft.

Wharton County: Joseph Hornberger, Jr. 1 Bodungen, in West Withers area, E. C. Ogburn Sur., Abst. 542, 7 mi. S of Pierce, dry, TD 7,405 ft.

SOUTH LOUISIANA

Tepetate Field Gets New Condensate Sand

NEW ORLEANS. — A new condensate sand has been opened at Tepetate field in Acadia Parish by A. J. Bankhead et al 1 Doris Fruge, 28-7s-2w. Drilled to a total depth of 9,187 ft., with sand showing oil topped at 8,714 ft., 18 perforations were made from 8,724-30 ft., and on potential the test flowed 75 bbl. of condensate per day through a 9/64-in. choke, gas-oil ratio 34,810-1, tubing pressure 3,100 lb., gravity 52°, no water.

Another producer for the Bayou De Fleur pool in Jefferson Parish is The California Co. 1 E. P. Brady, Lease 4, Unit 3, 65-16s-24e, which flowed a potential of 216 bbl. of 37°-gravity oil per day through ⅛-in. choke, gas-oil ratio 629-1, tubing pressure 1,725 lb., no water. Total depth is 10,502 ft., with production through perforations at 10,478-485 ft.

Exploratory drilling continues active in the South Louisiana District with Barnsdall Oil Co., Falcon Seaboard Drilling Co., Sohio Petroleum Co., and Humble Oil & Refining Co., announcing wildcat locations. The Barnsdall Oil 1 Ozeman Young, is in the area midway between Tepetate and West Tepetate fields in Acadia Parish; Falcon Seaboard 1 Willie Lopez, is in Iberia Parish, 5 miles northeast of Jefferson Island field and 5 miles southwest of the Spanish Lake prospect, contract depth 11,500 ft.; Sohio 1 Adam Bertrand is in 8-8s-4w, in Jefferson Davis Parish, in the Pine Island area, 3 miles southwest of China field; and Humble 1 Alfred Ray Romaine et al is a wildcat for Kaplan area of Vermilion Parish, 25-12s-12e.

There were five completions this week, one a dry wildcat in Acadia Parish, three oil producers, and one dry field well.

SOUTH LOUISIANA WILDCAT FAILURE

Acadia Parish: William Helis and Earl Bateman et al 1 J. L. Carriere, North

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Church Point area, 23-7s-2e, dry, TD 10,393 ft.

N. CENTRAL TEXAS

Saturation Encountered In Throckmorton County Test

WICHITA FALLS. — Fred M. Manning, Inc., 1 M. K. Graham Estate, Section 985, TE&L Survey, wildcat in the Masters pool, 2½ miles northeast of Woodson, Throckmorton County, topped the Mississippian at 4,532 ft. and drilled to 4,543 ft. On a 60-minute drill-stem test from 4,536-43 ft. there was gas in 15 minues. Recovery was 450 ft. of oil and 30 ft. of oil-cut mud. Electrical survey was run, and 5½-in. casing was set at 4,532 ft.

L. O. McMillan and Sherman Hunt, Jr. 1 Ida Thorn, Samuel Stewart Survey, Abstract 1069, wildcat 10 miles northwest of Gordonville, Grayson County, logged a porous sand from 5,000-05 ft. and started to blow out while circulating for samples. Operators increased mud weight from 10 to 12.5 lb., attempting to prevent a blowout. While the test was shut in to await thickening of the mud, the drill pipe stuck. The hole was plugged off with 500 sacks of cement. Preparations are being made to cut the pipe at 2,000 ft., set a whipstock, and drill a new hole to test the sand at 5,000 ft. Standard Oil Co. of Texas 1 Mitchell, J. B. McAnair Survey, northern Grayson County wildcat 2 miles north of Sherman, was swabbing from 8,468 ft., plugged-back depth. This section had a slight oil show on a drill-stem test while test was being drilled. Total depth is 11,542 ft.

John T. Cox et al 1 R. W. Davis, Block 1, SP Survey, wildcat 4 miles northwest of Eliasville, Young County, has been completed for 70 bbl. of 40°-gravity oil and 3,500,000 cu. ft. of gas daily from 3,548-76 ft. in the Caddo.

Wilson field, Cooke County, and Holliday field, Archer County, each had two completions this week. National field, Wilbarger County, had four locations and Ellis field, Jack County, Burk field, Wichita County, and Fargo field, Wilbarger County, each had two. National field has eight drilling wells; Sivell's Bend field, Cooke County, five; Holliday field, four, and Rose field, Haskell County, Cope and Knox fields, Young County, three.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCATS

Grayson County: New gas pay—Texas 3 Hanby, Samuel Stewart Sur., Hanby pool, flowed 469,000 cu. ft. gas day, 398-402 ft. Trinity, TD 1,286 ft.

Jack County: New gas pool—Continental 1-C Tom Cherryhomes, Florida Payne Sur. A-1564, 3 mi. N and 1 mi. W Joplin, elev. 1,007 ft., flowed 176,000 cu. ft. gas day, perf. 4,577-90 ft. Bend conglomerate, TD 5,626 ft.

Montague County: New oil pool—Continental 1-B Lewis, Nancy B. Ussery Sur., 4 mi. SW Montague, elev. 1,060 ft., flowed 1,292 bbl. day through perf. from 6,348-56 ft. Bend conglomerate, gravity 41°, gas-oil ratio 796 to 1, TD 6,455 ft.

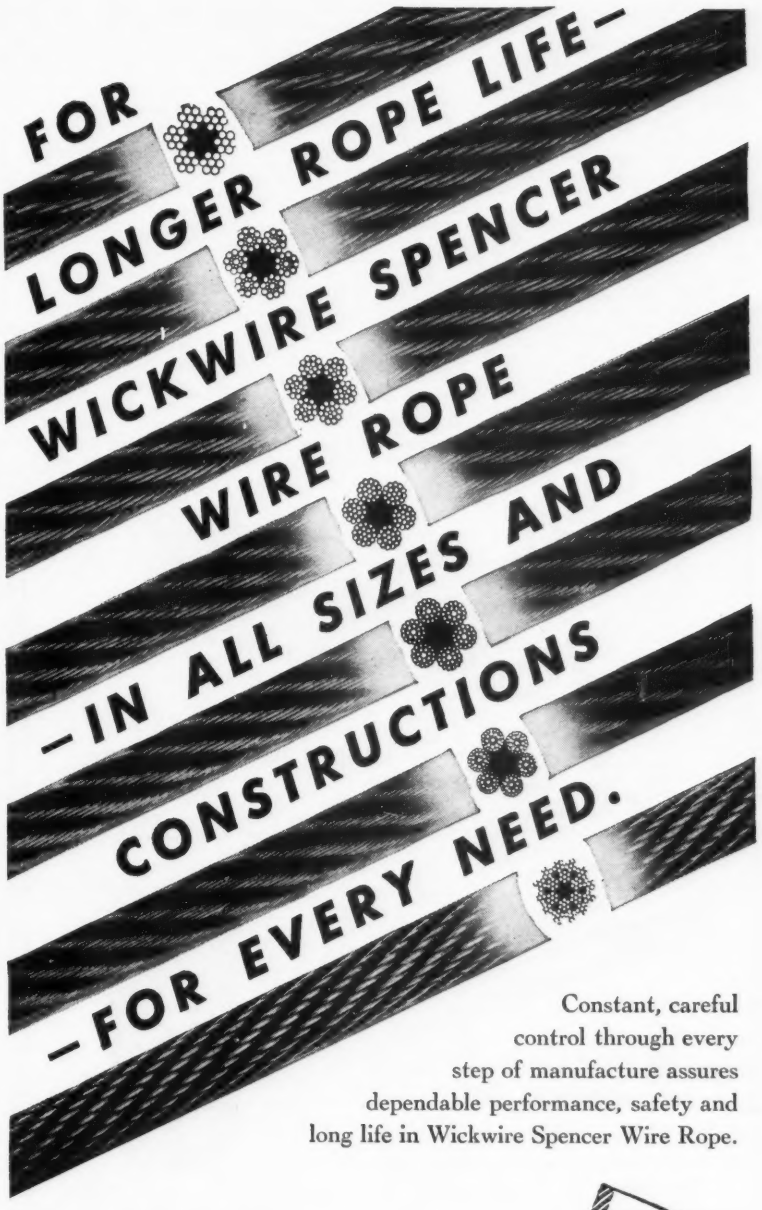
NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: D. L. Wolfe 1 J. M. Black, Allison Arms Sur. A-5, 6 mi. W and 1 mi. N Anarene, dry, TD 1,280 ft.

Cooke County: Danciger Oil & Refining Co. 1 H. E. Myers, Z. and H. Whitesides Sur. A-1228, 2½ mi. S Gainesville, elev. 707 ft., Detrital 3,116 ft., dry, TD 3,137 ft.

Frederick Electric Co. 1 L. B. Holland, A. Houston Sur. A-500, 3 mi. N and E Muenster, elev. 1,007 ft., dry, TD 1,233 ft.

Wilbarger County: Fred Manning 1 Emma



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Streit, Sec. 9, Blk. 33, H&TC Sur., 6 mi. S and 3 mi. W Vernon, elev. 1,289 ft., dry, TD 3,749 ft.

WEST CENTRAL TEXAS

ABILENE.—Jones County's first Strawn producer was indicated at R. H. Roark 1 E. T. Pitzner, wildcat 4 miles north of Merkel. The well kicked off and began flowing from 4,539-50 ft., a zone previously perforated and swabbed with no flows. Initial estimate of production ranged from 300 to 600 bbl. daily. The test was drilled to 5,321 ft. in the Ellenburger, topped at 5,285 ft. Operator was preparing to test.

Lewis Steffins field, Jones County, had three completions, and Eolian field, Stephens County, and Neianda field, Jones County, each had one. Lewis Steffins field, Reddin field, Jones County, Manning-O'Conner field, Stephens County, each had two locations. Jones County Regular field has five drilling wells; Manning - O'Conner field, Reddin field, Taylor and Jones counties, and Shackelford County Regular field, four, and Cisco field, Eastland County, Sanders field, Taylor County, and Santa Anna field, Coleman County, two each.

WEST CENTRAL TEXAS SUCCESSFUL WILDCAT

Taylor County: New oil pool—West Central and Ungren & Frazier 1 W. L. Kincaid, Sec. 27, Blk. 16, T&P Sur., 1¾ mi. NE Tye, elev. 1,789 ft., flowed 138 bbl. day through ¼-in. choke, perf. 2,613-21 King, gravity 45.6°, gas-oil ratio 310 to 1, TD 2,710 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Jones County: T. A. Kirk and Ray Oil Co. 1 A. Jobe, Sec. 14, SPRR Sur., 3¼ mi. S Anson, elev. 1,786 ft., Swastika 2,724 ft., dry, TD 2,791 ft.

H. W. Snowden 1 C. E. Dickerson, H. B. Williams Sur. No. 273, 4½ mi. NW Noodle, elev. 1,803 ft., Swastika 3,295 ft., dry, TD 4,328 ft.

S. A. Roberts 1 W. A. Minter, Sec. 26, Blk. K, T&P Sur., 3½ mi. NE Minter, elev. 1,719 ft., dry in Swastika, TD 2,719 ft.

Palo Pinto County: Ashland Oil & Refg. Co. 1 Halsell, Sec. 1736, TE&L Sur., 2¾ mi. NW Graford, elev. 1,168 ft., Ellenburger 4,972 ft., dry, TD 5,032 ft.

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SOUTHWEST TEXAS

Refugio County Pool Opener Flows 47 Bbl.

CORPUS CHRISTI.—Hecar Oil Co. 1 Jamie Hynes, a new oil pool opener in Refugio County, approximately 3 miles north of Refugio townsite, flowed 47 bbl. of clean oil per day through a ⅛-in. choke, with 900-lb. tubing pressure and 1,725-lb. casing pressure. Production is through perforations from 6,412-20 ft. in oil sand logged between 6,380-6,450 ft. Total depth is 6,465 ft. with 5½-in. casing set at 6,465 ft. This new field is north of Refugio field and west of Fox field, in the John Malone Survey, Abstract 48.

A new gas-condensate pay at McAllen field in Hidalgo County has been opened by Coastal Refineries and Cook & Thompson 1 Biedenharn. Drilled to a total depth of 9,302 ft., this well gaged 60 bbl. of condensate per day and 3,500,000 cu. ft. of gas through a ¼-in. choke, ratio 6,100-1. Tubing pressure 2,550 lb., casing pressure 2,800 lb. Gravity 51°. Production is through perforations from 7,696-7,714 ft., which is a deeper pay for this field. Another new deeper pay was indicated in the testing of this well when it flowed 30 bbl. of condensate and 2,912,800 cu. ft. of gas per day through perforations from 8,540-50 ft. through a 3/16-in. choke. On open flow this gaged 25,000,000 cu. ft. gas per day. Shut-in pressure is 3,100 lb.

Claud B. Hamill Ruth P. Sweatt, new oil pool opener in San Patricio County, 2 miles southeast of Taft field and 3 miles northeast of Taft townsite, flowed on potential test 34.15 bbl. of net oil, plus 58 per cent salt water, per day, through a g-in. choke. Gas-oil ratio 286-1, gravity 21°. Production is through perforations at 5,602-07 ft.

Continental Oil Co. has rigged up its second test in Clay West field, Live Oak County. The 2 Mrs. Clay West Burns, discovery well for this field, 9 miles southwest of George West, gaged 33 bbl. of amber condensate per day through a 9/64-in. choke, with gas-condensate ratio of 58,000-1, or a gas volume of 1,937,000 cu. ft. per day. Tubing pressure was 5,425 lb., and shut-in pressure 5,630 lb. Total depth 10,214 ft., with production through perforations in the Lower Wilcox zone from 10,121-132 ft. The new test is 1-A Mrs. Clay West Burns, and is 1,866 ft. north of the 2 well, in the Wesley Sellman Survey, Abstract 416.

H. B. Zachry Co. 1 Boothe, wildcat in Bee County, midway between Mineral field and Ray-Wilcox field, is an old abandoned well which has been deepened to a depth of 8,074 ft. On a 15-minute drill-stem test through perforations at 7,732-42 ft. and 7,750-90 ft., it flowed gas under 1,500-lb. working pressure, with bottom-hole pressure flowing 3,500 lb., shut-in. 3,500 lb.

There were 32 new locations reported this week, 7 being wildcats, 3 in Webb, and 1 each in Bee, Calhoun, Medina, and Travis counties. The 25 completions included 2 pool openers, a condensate discovery in Live Oak County, and an oil discovery in San Patricio County. Seven wildcats were dry, 2 each in Brooks and Webb counties, and 1 each in Bandera,

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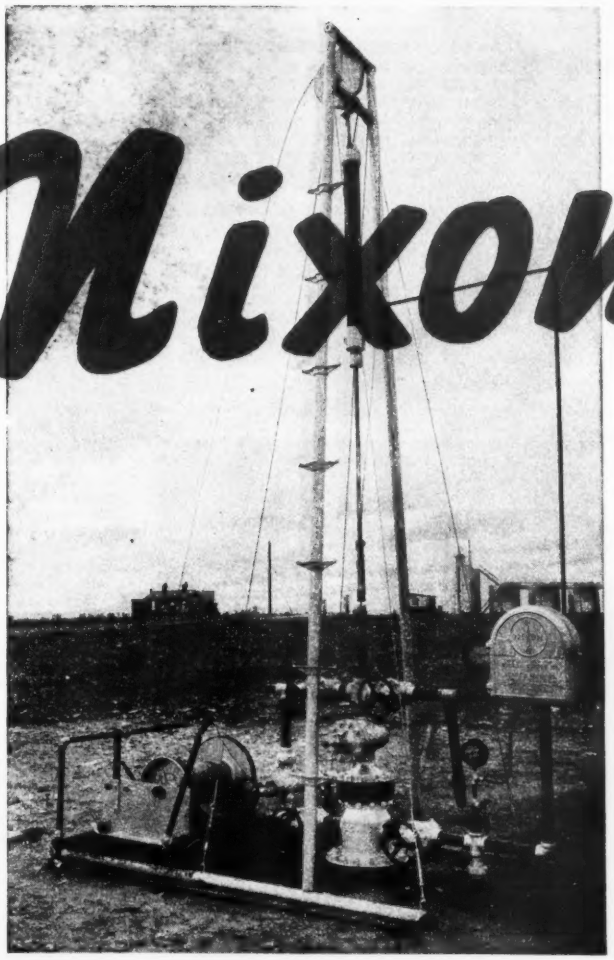

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Refugio, and Williamson counties. Jim Wells County received the greatest number of new locations with four reported.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Live Oak County: New condensate pool—Clay West—Continental Oil Co. 2 Mrs. Clay West Burns, in Wesley Sellman Sur., 9 mi. SW of Geo. West, TD 10,214 ft., perf. 12 holes 10,121-132 ft., PT 33 bbl. condensate per day through 9/64-in choke, gas-condensate ratio 58,000 to 1, flowed 10,250,000 cu. ft. gas per day on open flow, with amber condensate, TP 5,425 lb., SIP 5,630 lb.

San Patricio County, New oil pool—Claud B. Hamill 1 Ruth P. Sweatt, Lot 4, Sec. 7, 2nd Subd. of Taft Farm Lands, 2 mi. SE of Taft field, top pay 5,604 ft., TD 5,642 ft., perf. 20 holes 5,602-07 ft., PT 34 bbl. per day net oil through a ⅛-in. choke, gas-oil ratio 286 to 1, TP 260 lb., casing sealed, gravity 21°, 58 per cent water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bandera County: Ray E. Pool 1 E. L. Rainey, GH&SA Ry. Co. Sur. 16, 5 mi. E of Vanderpool, dry, TD 1,020 ft.

Brooks County: J. W. Gorman 1 Farmers Life Ins. Co., SK&K Sur. 557, 10 mi. NE of Freer, 4 mi. W of Strake field, dry, TD 3,617 ft.

Taylor Refg. Co. 4-E E. A. Parr, J. Poitevent Sur. 279, dry, TD 5,055 ft.

Refugio County: Monday Oil Co. 1 F. V. W. Heard Est., James Power Sur., 6 mi. W of Refugio, dry, TD 6,160 ft.

Webb County: Dulaney Oil Co. 1 Frost Nat. Bank, Sur. 603, 8 mi. SW of Mirando City, dry, TD 2,411 ft.

O. W. Killam 1 A. M. Bruni Est., T. Vasquez Sur. 78, 5 mi. SW of Bruni, dry, TD 3,670 ft.

Williamson County: H. G. Albert et al 1 Carl Buonger, in Peter Cartwright Sur., 6 mi. SE of Taylor, dry, TD 1,098 ft. in Austin chalk.

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CALIFORNIA

Extension Adds Productive Acreage to Cymric Field

LOS ANGELES.—Addition of several new productive locations to the Cymric field, Kern County, San Joaquin Valley district, appeared probable this week by preliminary completion of Honolulu Oil Corp.'s stepout well on the north end of the area. The well, Honolulu 22-155 Midway-Premier, 22-29s-21e, appears to have cut a previously mapped fault or disproved the existence or location of this geological feature.

The Honolulu well topped Oceanic oil sand at 4,684 ft., and was drilled to 4,978 ft. On 11/64-in. choke, the well flowed 328 bbl. of 36° gravity oil in 24 hours with 166,000 cu. ft. of gas. Pressures were 800 lb. on tubing and 910 lb. on casing. The productive rate on small choke, low gas-oil ratio and relatively high pressures combine to make the well one of the most satisfactory completions in the field.

Much interest this week centered around Pacific Western Oil Corp. et al 1 National Royalties, a Vedder wildcat test in 5-26s-22e, in the Miramonte district, Kern County. The well is currently drilling at 14,773 ft., deepest in California, and is reported to have topped Vedder around 14,500 ft. High pressures have been observed and the well is reported to have blown out or threatened to blow out on two occasions since passing the 14,500-ft. mark. It is a "no dope" hole with several companies participating in exploring for deeper production.

In the South Mountain View area, Kern County, Union Oil Co. of California 71 DiGiorgio, 3-31s-29e, flowed by heads upon stimulation by swabbing at the rate of 200 to 250 bbl. daily of 20° gravity crude and the well will be completed on pump. Oil is believed coming from the Santa Margarita but the schist is also open to production. The well is bottomed at 4,705 ft. and 7-in. is set at 4,458 ft. Top of oil sand was picked up at 4,505 ft. and top of schist at 4,540 ft.

A production test is scheduled this week on Basin Oil Co. 1 Standard Brick, 28-2s-14w, a deep wildcat at Inglewood, Los Angeles County. Operators have casing on the pipe rack and total depth of the well was last reported at 9,931 ft.

Numerous rank wildcat locations were included in the new work announced last week, a rather notable departure from recent trends in California operations which have emphasized deeper drilling in search of new pools under existing fields. Among counties receiving rank wildcat locations are Butte, San Joaquin, San Mateo, and Monterey.

California operators authorized 62 new drilling wells last week, the greatest number of new starts in many months. Seventeen locations authorized in the Wilmington field, Los Angeles County, topped the list of new activity. Union Pacific Railroad Co. accounted for 16 of the new Wilmington locations.

Amerada Petroleum Corp. prepared to start its first well on property in the Huntington Beach field acquired in a trade with A. W. Lyddon, operator, near the latter's Anaheim Sugar discovery.

CALIFORNIA SUCCESSFUL WILDCAT

Ventura County, Del Valle area: Superior Oil Co. and British-American Oil Producing Co. A-3 Black, 13-4n-18w, pump 71 bbl., 18° gravity oil, TD 4,692 ft.

CALIFORNIA WILDCAT FAILURES

Los Angeles County, East Los Angeles area:

C.C.M.O. Co. 1 Bandini, 21-2s-12w, form. test 9,700-30 ft., rec. all mud and water, TD 12,930 ft., converting to water well.

Kern County, Kern River area: P. H. Frank and Elmer von Glahn 1 KCLC, 8-29s-28e, dry, TD 2,047 ft.

Sheep Springs area: Miller & York 1 Richardson, 18-29s-21e, top brown shale 1,443 ft., top Carneros 2,248 ft., gray sand, dry, TD 2,355 ft.

Solano County, Kirby Hills area: Standard Oil Co. of California 2 Kirby Comm., 34-4n-1w, form. test 5,435 ft., rec. 2,375 ft., mud, dry, TD 6,300 ft.

ROCKY MOUNTAIN

Madison Lime Production Found in Elk Basin Field

DENVER.—A discovery in the Madison lime, a deeper horizon, in the Elk Basin field on the Wyoming-Montana boundary is imminent in Stanolind Oil & Gas Co. 38-M Unit, NE SE NE 24-58n-100w. Top of the Madison was at 4,350 ft., and a drill-stem test at 4,402-25 ft., open 1 hour, resulted in a recovery of 180 ft. of oil and 30 ft. of oil-cut mud, the flowing pressure being 75 psi. Gas broke through into the test 29 minutes after the tool was opened. Bottom-hole pressure at this depth was 1,750 psi. The hole then was drilled to 5,401 ft., and a drill-stem test at that depth with packer at 4,473 ft., resulted in a recovery of 945 ft. of oil and oil-cut mud through a ⅜-in. choke at the bottom and a 1-in. choke at the top in 1 hour. The two tests indicate that approximately 151 ft. of saturated lime has so far been cored and drilled. The section is estimated to be 600 ft. thick and probably will be penetrated before drilling is concluded. First test indicated the crude was 18°-gravity, which is normal for Madison lime oil in the Big Horn Basin, but on the second test the gravity was 29° corrected.

The discovery well is on the top of the structure, and prior to the unitization of the field in June 1946, was known as Continental Oil Co. 101 E-T Elk 2. It was completed in September 1943 at 4,136 ft. for 100 bbl. per hour from the Tensleep, topped at 3,938 ft. Elk Basin was discovered in 1915 and has produced in excess of 12,000,000 bbl. of light oil from the Frontier at around 1,400 ft. A discovery was made in the Tensleep in 1942, and at the time of unitization had 128 wells producing from that horizon, the oil being 31° gravity. The unit area comprises 18,000 acres with approximately 6,000 acres within the participating area. The field is about drilled up in the Tensleep and the first well drilled since unitization is the Madison test. Stanolind is operator for the unit. Two more wells are drilling, these being outposts on the north and southwest to fill out the pattern for producing the participating area.

River Dome discovery acidized.—Pure Oil Co. 1 Unit, NE NW 18-48-92w, River Dome, Washakie County, Wyoming, a discovery in the Embar nearly a year ago at a total depth of 11,379 ft., and plugged back to 10,131 ft., has been acidized and responded favorably to treatment. It was making only 1 bbl. per hour natural on last tests before acidizing. It was treated with 1,560 gal. at 10,020-55 ft., and after cleaning up flowed 40 bbl. of oil through a ¼-in. choke in 9½ hours. Then it was reacidized with 5,000 gal. and flowed 140 bbl. of oil in 12½ hours through ¼-in. choke, the crude testing 41.8° gravity. Then it was put on a production test and averaged 165 bbl. per day through ¼-in. choke, the gravity improving to 43.5°. The second well, 1½ miles to the northwest, 2 Unit, is still flowing 75 bbl. per day after acidizing with a total of 7,000 gal. This well had the top of the Embar at 10,276 ft., 150 ft. lower than the discovery. The oil runs around 33.8° gravity.

Oil show in Montana wildcat.—Big West Oil Co. 1 Proefrock, NW NW 7-34n-4w, on the eastern edge of the Cut Bank field gas area and between the Cut Bank and Kevin-Sunburst pools, is swabbing around 15 bbl. of oil per day from the lower Cut Bank sand at 2,318-42 ft. It is located ½ mile south of Union Oil Co. 1 Dahlquist, which was completed last May for 11,600,000 cu. ft. of gas, and a mile northwest of Big West 1 Dahlquist completed in July for 6,170,000 cu. ft. It is still testing and whether it will open an oil pool in the gas area is not yet apparent.

New operations.—Twenty-one new operations were reported, of which eight were in Colorado, four in Wyoming, and nine in Montana. The Colorado locations were all in the Rangely field except the Skelly Oil Co. wildcat in Baca County, mentioned above. The Wyoming operations, all development wells, included one each at Gebo, and Byron and two in the Hamilton Dome field. The Montana operations included three in the Bowdoin shallow gas field, two in Cut Bank, two in Kevin-Sunburst, one in Cedar Creek and one in the Twin Buttes area. Last named, in Stillwater County, is the only wildcat, being Union Oil Co. 1 State, C SE NW 16-2n-20e. It is 12 miles north of the Lake Basin field and 6 miles west of a test drilled to 4,050 ft. several years ago by Barnsdall Oil Co. on the Lake Basin anticline.

Completions.—Fourteen wells were completed, of which 11 were oil wells with initial production of 2,638 bbl., 2 were gas wells and 1 was a dry hole. Colorado had 5 completions for 2,105 bbl., all in the Rangely field. Wyoming had 4 completions, of which 3 were oil wells for 452 bbl., and 1 was a dry hole. The oil wells were one each at Gebo, Rock River and Byron. The dry hole was a wildcat. Montana had 5 completions, of which 3 were oil wells for 81 bbl. initial, and 2 were gas wells. The

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SEE PAGE 45

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oil wells were 1 in Cat Creek and 2 in Kevin-Sunburst.

WYOMING WILDCAT FAILURE

Airport Area, Natrona County: Commercial Oil & Gas Co. 1 Rubish, NE NE SE 25-35n-80w, TD 4,460 ft., dry and abd.

ILLINOIS

New Aux Vases Field In Prospect for White County

MATTOON.—C. E. Brehm et al 1 Clyde Callicotte, SE SE NW 10-6s-10e, White County wildcat 1 mile northeast of the Concord field, has apparently opened a new producing area. Excellent saturation was encountered in the Aux Vases sand at 2,950-60 ft., total depth, and 5-in. casing has been set to 2,935 ft. On a drill-stem test of the saturated section, gas was recovered in 4 minutes and a flow of clean oil started in 35 minutes.

Dry holes in the immediate vicinity which may limit the productive acreage of the new strike are located approximately 1½ miles to the east, 1 mile to the northwest, and 1 mile to the south. Nearest dry hole to the northeast is nearly 2 miles distant, while the nearest to the southeast is about ¾ mile from the present test. While dry holes have been drilled through the Aux Vases on both sides of the northern end of the Concord field, none have been drilled within a ½-mile-wide strip directly north of production, and the 1 Callicotte might possibly be a northeast trending extension of that field.

Operators continued testing of the Levias lime during the past week at Wabash County's most recent pool opener, the Sam Malis 1 W. L. Litherland, NW NW SE 20-1n-13w, northwest of the Friendsville field. Latest gage reported was 212 bbl. on pump. The test may be acidized before completion.

ILLINOIS SUCCESSFUL WILDCATS

Gallatin County: Wiser Oil Co. 1 Mittsdorffe, NE SE NW 24-8s-8e, pumped 21 bbl. oil in 24 hr., Aux Vases 2,745-65 ft., acidized with 3,000 gal., TD 2,938 ft.

Lawrence County: S. Vanetis et al 2 Powell, SE NW NW 23-3n-11w, pumped potential of 550 bbl. oil in 24 hr., McClosky 1,907-10 ft.

Wayne County: H. O. Yoder 1 W. C. Fox, SE NE SE 4-3s-8e, pumped 15 bbl. oil in 24 hr., Aux Vases sand 3,366-85 ft., shot at 3,366-85 ft. and 3,365-70 ft.

ILLINOIS WILDCAT FAILURES

Christian County: O. A. Reed 1 Bennett, SE SE SE 27-15n-1w, dry, TD 950 ft., water in sands at 754-65 ft. and 938-50 ft.

Clay County: A. J. Slater 1 J. Gray, SE NE NE 29-3n-6e, dry, TD 3,168 ft., Cypress sand 2,641 ft., Ste. Genevieve 2,990 ft., McClosky 3,065 ft.

Clinton County: W. H. Krohn 1 R. Brinkenann, SE SE NW 25-1n-3w, dry, TD 1,301 ft., Cypress sand 1,125 ft., Benoist 1,239 ft., Aux Vases 1,295 ft.

Joe Kesl, Jr., 3 Maibaum, NW NE SE 12-3n-3w, dry, TD 1,160 ft., Bar lime 960 ft., Cypress sand 1,035 ft., Benoist sand 1,152 ft.

Coles County: Ernest Zink 1 Goff, NW SW NW 18-11n-10e, dry, TD 1,946 ft., Aux Vases 1,827 ft., McClosky 1,899 ft.

Ernest Zink 1 Woodward, NW SW SW 18-11n-10e, junked hole at 1,920 ft., Bar lime 1,686 ft.

Cumberland County: National Association 1 Handley, SW SE SE 26-10n-7e, dry, TD 3,815 ft., McClosky 2,360-69 ft., St. Lawrence 2,438 ft., Devonian 3,670 ft.

Ben Nation 1 Decker, SE SE SE 6-10n-10e, dry, TD 2,053 ft., Cypress 1,779 ft., Ste. Genevieve 1,938 ft.

Nation Oil Co. 1 McMeehan, NE SE SE 31-11n-10e, dry, TD 1,958 ft., Cypress

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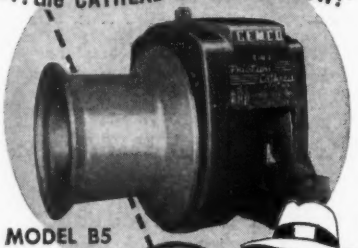

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sand 1,707 ft., Aux Vases 1,811 ft., Fredonia 1,888 ft.

Ben Nation et al 1 Strong, NW NW SW 9-10n-10e, dry, TD 1,832 ft., Cypress 1,480 ft., Ste. Genevieve 1,710 ft., Fredonia 1,744 ft.

Edgar County: Frank Scales 1 Kingert, SW SW SE 26-14n-14w, dry at 160 ft.

Edwards County: Vic & Van Operating Co. 1 S. Birk, NE NE SW 36-2n-10e, dry, TD 3,299 ft., Ste. Genevieve 3,137 ft., McClosky 3,208-12 ft., with show of oil, DST 3,214-99 ft., open 1 hr. recovered 90 ft. mud and show of oil.

Effingham County: National Association 1 Liberty School, SE SE NW 21-9n-4e, dry, TD 2,012 ft., Aux Vases sand 1,785 ft., Fredonia 1,882 ft.

Fayette County: National Associated Petroleum 1 Salzman, SW SW SW 16-5n-4e, dry, TD 2,545 ft., Aux Vases 2,351 ft., Ste. Genevieve 2,401 ft., McClosky 2,453 ft.

Gallatin County: Texas Co. 1 McGehee, SW SW NE 29-9n-9e, dry, TD 2,515 ft., St. Genevieve 2,286 ft., Rosiclare 2,347-53 ft., with show of oil.

Jasper County: Thomas H. Hicks 1 Steber, NE NE SW 7-5n-14w, dry, TD 2,898 ft., Ste. Genevieve 2,839 ft., McClosky 2,884-92 ft., with show of oil.

Lawrence County: C. E. Skiles 1 J. Litherland, SE SW NE 13-2n-12w, dry, TD 2,038 ft., Ste. Genevieve 1,905 ft., McClosky 1,935 ft., with slight show of oil.

Moultrie County: Ben Taylor 1 Joe King, SE NE SE 5-12n-6e, dry, TD 2,028 ft., Aux Vases 1,884 ft., Ste. Genevieve 1,924 ft., Fredonia 1,972 ft.

Shelby County: Paxton Oil Syndicate 1 Lovins, NE NE NE 36-12n-5e, dry, TD 2,110 ft., Aux Vases 1,978 ft., Ste. Genevieve 2,018 ft., McClosky 2,091 ft.

National Associated 1 Kick, SE SW NW 27-10n-6e, dry, TD 2,353 ft., Ste. Genevieve 2,217 ft., McClosky 2,283 ft.

Wabash County: C. E. Skiles 1 E. Woods, SE NW SE 25-1n-14w, dry, TD 2,980 ft., Aux Vases sand 2,842 ft., Ste. Genevieve 2,870 ft., McClosky 2,943 ft.

Wayne County: George Daly 1 Rutger, SE SW NW 9-1n-7e, dry, TD 3,250 ft., Benoist lime 2,993 ft., Ste. Genevieve 3,156 ft., Fredonia 3,197 ft., McClosky 3,205 ft.

E. A. Obering 1 Milner, SE SE SE 26-1n-5e, dry, TD 3,117 ft., Cypress sand 2,698 ft., Benoist 2,793 ft., Aux Vases 2,915 ft., McClosky 3,043 ft.

White County: B. M. Heath 1-A Hamilton, SW SW SE 13-7s-8e, dry, TD 2,245 ft., Tar sand 2,222-37 ft., with slight show of oil.

APPALACHIAN FIELD

Southwest Pennsylvania Field Extended Southward

PITTSBURGH.—On Chestnut Ridge in Georges Township, Fayette County, Southwest Pennsylvania, New Penn Development Co., William E. Snee et al topped the Onondaga lime at 7,047 ft. and the chert at 7,062 ft. in the wildcat on J. R. Smith farm from a surface elevation of 2,500 ft. At 7,063 ft., a volume of 500,000 cu. ft. gas was struck which caused a fishing job. This test is 6,600 ft. south of 6 Barton and extends the southern end of the field by that much. It is 29 ft. higher on structure to the top of the chert than 6 Barton which struck the chert at minus 4,591 ft., and it also has the highest volume of gas at the top of the chert. It is expected to be a large well.

New locations totaled 11 and were located in Armstrong, Greene, Indiana, Washington, and Westmoreland counties.

In the Elk district Oriskany extension, Kanawha County, West Virginia, United Fuel Gas Co. completed a test 5,774 E. J. Gatchell in the Oriskany sand at 5,516,000 cu. ft. of gas, natural, with a surface elevation of 873 ft., Corniferous lime 5,103 ft., Oriskany 5,214 ft., gas 5,203-38 ft., and total depth 5,248 ft.

New locations for the week reached a high of 31 and were located in Calhoun, Doddridge, Kanawha, Lewis, Lincoln, Marion, Pleasants, Putnam, Ritchie, Roane, Upshur, Wayne, Wirt, Wood and Wyoming counties.

OKLAHOMA

Expect Rapid Development At Third Cotton County Pool

COTTON County's third shallow pool, opened last week by the S. D. Johnson et al 1 Simon, NE SE NW 9-3s-11w, will apparently be developed at a pace comparable to that set by the Essaquanahdale and Cache Creek pools to the southeast. The 1 Simon, about 2½ miles northwest of the Essaquanahdale field, flowed oil on a drill-stem test of a sand at 1,580-1,615 ft., total depth, and it is estimated as capable of producing from 200 to 500 bbl. of oil daily. Plug is now being drilled prior to completion tests. Five new locations have already been made in the pool and some of them are drilling. The locations include the S. D. Johnson et al 2 Cooper, in SW NE of 9; Johnson et al 2 Simon, in SE NW of 9; Johnson et al 3 Simon, in SE NW of 9; W. H. Peckham 1 Simon, in SE NW of 9, and the Martin Corp. 1 Calloway, in SE SE of 4.

Another important Cotton County development is the L. C. Choate 1 Shelby, NW NW SE 5-4s-10w, wildcat 1½ miles east of the Cache Creek pool. Casing has been set on bottom at 1,356 ft. in this well, according to field reports it is expected to make a good well. The 1 Shelby is believed to be an eastern extension of the Cache Creek pool, but it will take additional drilling to definitely determine this fact.

Meanwhile, a new Wilcox sand strike has been made 4 miles east of Billings in the northwest corner of Noble County. During an initial flow test of approximately 5 hours from open hole at 4,662-92 ft., total depth, the Big Bear Oil Co. 1 Curby, NW NW SW 23-24n-2w, produced 400 bbl. of fluid, mostly oil. In addition to the Wilcox at 4,670 ft., a portion of the Marshall zone is also producing. The well, now shut down awaiting tankage, has been treated with 2,000 gal. of acid, and is estimated as a 200 to 400-bbl. well.

OKLAHOMA SUCCESSFUL WILDCAT

Okfuskee County: T. N. Berry 1 Catlett, NE NW SW 29-10n-11e, flowed 12 bbl. of oil per day from Booch at 2,260-90 ft., 1st Gilcrease 2,552 ft., 2nd Gilcrease 2,700 ft., Union Valley 3,090 ft., Cromwell 3,140 ft., TD 3,155 ft.

OKLAHOMA WILDCAT FAILURES

Caddo County: Chicago Oil Corp. 1 Tracy, NE NE NE 19-5n-13w, dry, TD 1,503 ft., sand 812-13 ft. with a stain of oil, sandy lime 870-95 ft.

Cleveland County: J. E. Trigg 1 Urbansky, NE NW SE 19-10n-2w, dry, TD 7,762 ft., Pawhuska 3,594 ft., Tonkawa lime 4,840 ft., chert 5,600 ft., 1st Oolitic 6,258 ft., 2nd Oolitic 6,418 ft., Big Lime 6,670-700 ft., Oswego 7,130 ft., Prue sand 7,180 ft., Bartlesville 7,612 ft. with a show of oil.

Cotton County: Barrett & Ross Drilling 1 G. T. Horn, Jr., SE NE NE 13-4s-11w, dry, TD 1,440 ft., sand 1,085-1,120 ft. and 1,310-19 ft.

D. H. Bolin 1 Mahler, SW SW NE 32-3s-11w, dry, TD 2,021 ft., no tops reported.

J. W. Hastings, Jr. 1 Cliff, SE SW SE 1-5s-10w, dry, TD 2,035 ft., no tops reported.

Garvin County: Dearing & Sons 1 J. W.

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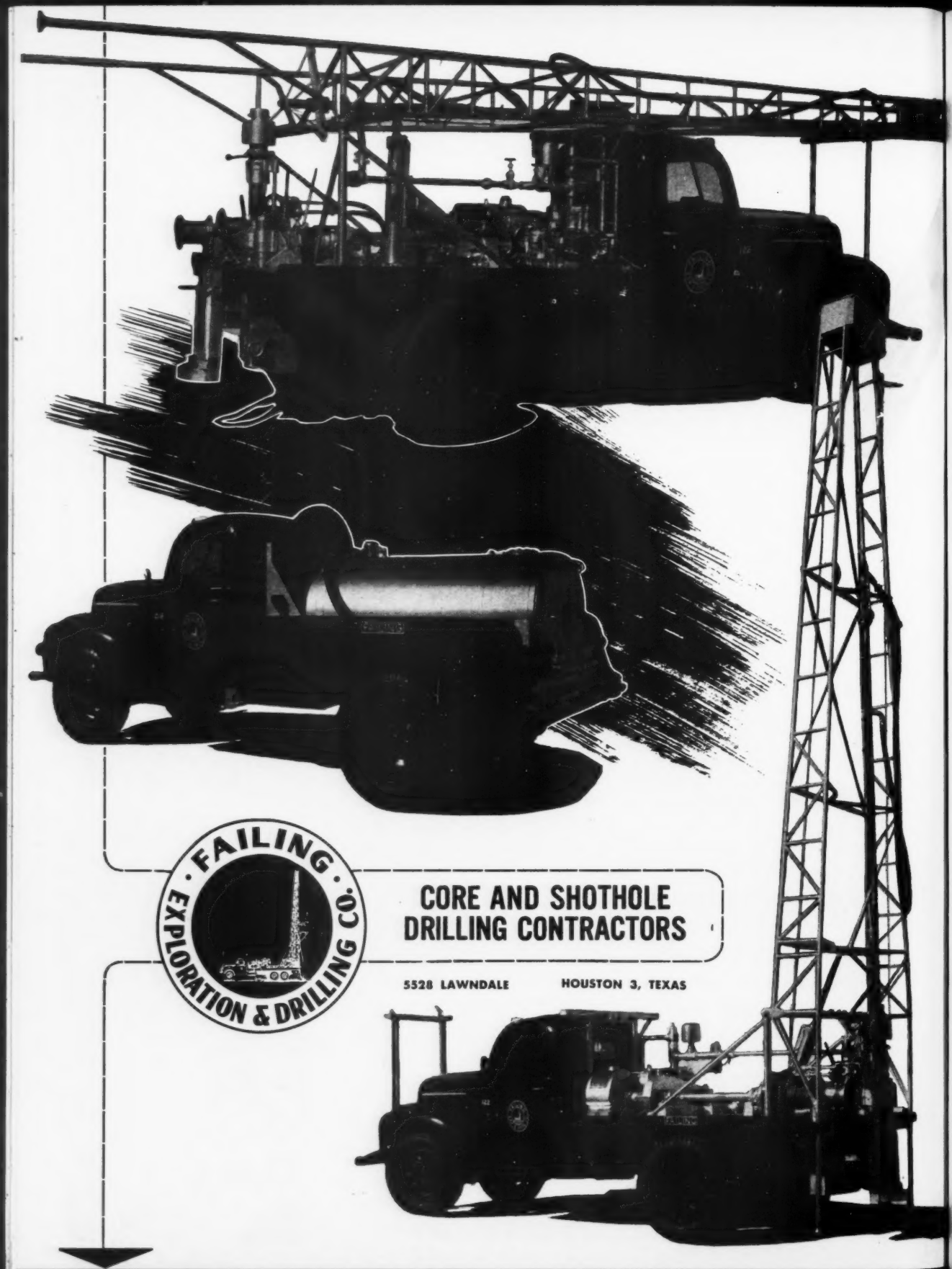
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Gibson, NE NE NE 15-4n-2w, dry, TD 6,564 ft., Viola 6,004 ft., Bromide dense 6,197 ft., hard white porous sand 6,276-80 ft.

Pontotoc County: W. A. Delaney, Jr. 1 Payton, NE SE NW 6-4n-8e, dry, TD 3,900 ft., Wapanucka 2,615 ft., Cromwell 2,812 ft., Mayes 3,545 ft., Woodford 3,645 ft., Hunton 3,840 ft., Sylvan 3,898 ft.

Seminole County: Gulf 1 S. Larney, SE NE NE 31-10n-7e, dry, TD 3,749 ft., Calvin 2,425 ft., Senora lime 2,900 ft., Earlsboro 3,220 ft., Inola 3,375 ft., brown lime 3,515 ft., Booch 3,624 ft., Gilcrease 3,696 ft., Cromwell 3,710 ft.

Stephens County: Rocket Oil 1 Paschall, NE NW SE 32-1s-5w, dry, TD 1,245 ft., sand 1,015-20 ft., 1,043-59 ft., 1,093-103 ft., and 1,110-19 ft., all sands showed a dead oil stain.

OHIO, KENTUCKY

Productive Area Extended By Pure Oil Completion

COLUMBUS.—Pure Oil extended oil and gas production at Fultonham ¼ mile east by its completion on L. M. Thompson, Section 25w, Newton Township, Muskingum County. The Clinton from 3,417-3,464 ft. was shot with 90 qt. and swabbed and flowed 72 bbl. in 24 hours.

Ohio Fuel 1 D. M. Page, Lot 34, La Grange Township, Lorain County, a west extension to the North La Grange pool, found the Clinton from 2,402-2,407 ft. with a gage of 618,000 cu. ft.

Cambridge field reported 9 of the 39 new locations for the week; Ashland, Sandyville, and Brush Creek reported 6 each; Mt. Vernon and Stewart 5 each, and Lancaster 2. Ashland had 10 of the 34 completions for the week.

WESTERN KENTUCKY

OWENSBORO. — Two successful wildcats in Daviess County were reported during the past week. The J. Ashby et al 1 J. H. Gregory, 20-P-27, wildcat about 1 mile east of the Birk City pool, made an 8-bbl. pumper in the Jackson sand at 1,515-33 ft., total depth, and may be an extension to that pool.

John B. Moore et al have announced a tentative location for a new wildcat test in Henderson County. The test will be the 1 E. B. Allen, NE SW 5-P-26, about 3 miles south of Spottsville. Nine other new operations were announced during the week and included three in Henderson, two each in Crittenden and Webster, and one each in Union and McLean counties.

WESTERN KENTUCKY SUCCESSFUL WILDCATS

Daviess County: J. Ashby et al 1 J. H. Gregory, 20-P-27, elev. 383 ft., pumped 8 bbl. per day, 40-qt. shot Jackson 1,515-33 ft., TD 1,533 ft.

J. C. Ellis et al 2 Shipp Heirs, 9-P-28, elev. 381 ft., pumped 20 bbl. oil per day, 20-qt. shot Palestine 1,014-19 ft., TD 1,019 ft.

INDIANA

EVANSVILLE. — Exploratory activity in Indiana continued at a slow rate during the past week, with only one wildcat completion, a dry hole in Gibson County, reported. New operations also showed a decline from the previous week with only seven new tests announced. These were located four in Posey County, two in Gibson, and one in Vanderburgh.

INDIANA WILDCAT FAILURE

Gibson County: Superior Oil 1 Hazed Yeager, SW NE SE 13-2s-12w, elev. 394 ft., dry at 2,373 ft., Menard 1,507 ft., Glen Dean 1,771 ft., Golconda 1,845 ft., Cypress 1,962 ft., Benoist 2,123 ft., Renault 2,185 ft., McClosky 2,321 ft.

MISSISSIPPI

Largest Producing Well in Sunniland Field Completed

TALLAHASSEE.—Interest in Florida's activity this week is centered around Collier County where tests herald Humble Oil & Refining Co. 8 Gulf Coast Realty Co., 19-48s-30e, as Sunniland field's most important producing well. The well cored at 11,565-72 ft., set 5½-in. casing at 11,569 ft., gaged approximately 484 bbl. of 24.5°-gravity oil per day through ¼-in. choke through perforations at 11,569-74 ft., and was bottomed at 11,576 ft. Flowing pressure on the tubing was 345 lb. and pressure on the casing was 400 lb. The location is 1½ miles northwest of the field's discovery well, Humble 1 Gulf Coast, and ½ mile south of the company's No. 6 well. There were 8 active wildcats reported for the state, the deepest hole being Gulf Refining Co. 1 State Lease 373, 2-67s-29e, Monroe County, which had encountered several oil shows and is drilling ahead in lime below 11,625 ft.

A summary of operations in Mississippi shows 86 wells: 4 field completions, 54 other field wells; 2 dry wildcat completions and 17 active wildcats; 6 new pool locations and 3 new wildcat locations.

MISSISSIPPI WILDCAT FAILURES

Wayne County: I. P. LaRue 1 W. R. Barnhill, NW NW 21-8n-9w, dry, TD 7,921 ft., Cook Mountain 990 ft., Sparta 1,110 ft., Wilcox 6,648 ft., Midway 4,242 ft., Eutaw 6,013 ft., Tuscaloosa 6,504 ft., Marine Tuscaloosa 7,367 ft., Massive sand 7,528 ft.

Yazoo County: Stanolind Oil & Gas Co.

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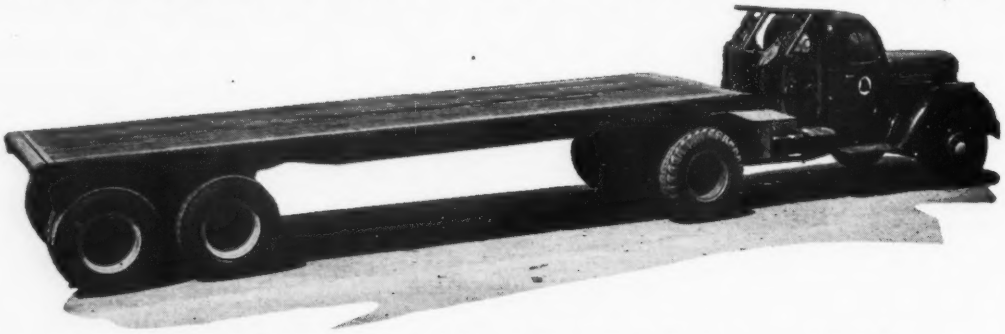

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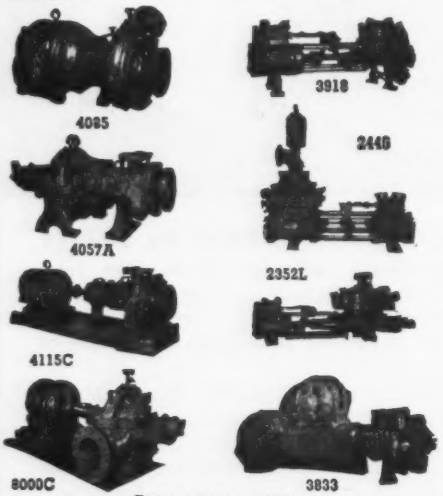

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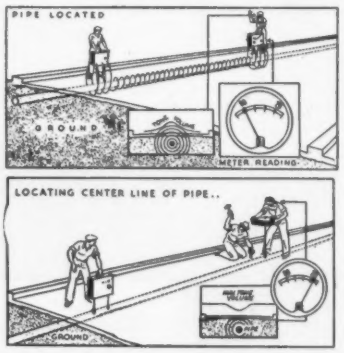

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SUMMARY OF AUGUST COMPLETIONS

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft	Total footage	Rigs and drilling
New York	128	66	203	0	*62	0	128	0	0	0	183,354	156
Pennsylvania	297	162	396	11	†124	18	252	27	0	0	426,173	248
West Virginia	67	13	82	46	8	1	31	30	5	0	187,813	217
Ohio	116	40	577	36	40	16	45	55	0	0	287,982	229
Indiana	33	20	1,578	0	‡13	4	22	7	0	0	63,470	64
Kentucky	38	9	786	13	16	3	17	18	0	0	84,935	57
Illinois	182	112	15,438	1	69	4	73	105	0	0	459,093	252
Michigan	92	22	2,320	16	54	1	61	28	2	0	183,890	99
Kansas	199	108	45,401	21	70	0	24	172	3	0	641,294	301
Neb., Mo., Iowa	6	0	0	0	6	4	1	1	0	0	7,951	13
Oklahoma	250	150	17,654	28	§72	7	68	136	36	3	830,202	423
Texas	752	444	122,297	56	252	40	161	293	239	19	3,320,175	925
North	171	83	16,281	0	88	25	73	57	16	0	459,291	146
West Central	81	32	3,839	1	48	5	32	42	2	0	212,779	51
West	183	154	73,870	1	28	5	32	83	59	4	885,241	272
Panhandle	24	12	1,684	12	0	0	5	19	0	0	70,857	87
Eastern	89	47	11,252	23	19	0	6	39	44	0	474,045	119
Upper Gulf Coast	67	40	5,518	2	25	0	1	14	39	13	496,484	94
Lower Gulf Coast	77	54	7,658	12	11	0	1	9	65	2	498,324	109
South	36	11	1,440	5	20	0	9	21	6	0	133,647	22
South Central	24	11	755	0	13	5	2	9	8	0	89,507	25
Louisiana	139	70	11,291	15	54	1	29	46	38	25	778,007	199
Northern	86	46	6,088	13	‡27	1	26	40	18	1	320,385	90
Southern	53	24	5,203	2	27	0	3	6	20	24	457,622	109
Arkansas	16	10	1,506	0	6	0	3	9	4	0	66,701	35
Mississippi	17	10	2,703	0	7	0	0	2	8	7	131,420	61
Ala., Ga., Florida	3	0	0	0	3	0	0	2	1	0	16,142	9
Montana	36	17	1,219	8	11	3	20	13	0	0	76,399	74
Wyoming	21	15	3,337	1	5	1	3	12	5	0	79,074	68
Colorado	16	16	6,760	0	0	0	0	0	16	0	102,759	82
New Mexico	40	32	7,993	3	5	4	4	18	14	0	169,192	102
California	115	91	32,610	3	21	3	22	44	41	5	551,364	194
Total August	2,563	1,407	274,151	258	898	110	964	1,018	412	59	8,647,390	3,808
Total July	2,316	1,241	217,706	246	829	118	885	922	342	49	7,719,399	3,732

Service wells, five weeks ending August 31, 1946: *62, †124, ‡1, §2.

1 Mrs. Cornelia Heagman, SE NW NE 9-11n-5w, dry, TD 5,200 ft., no tops reported.

ALABAMA WILDCAT FAILURE

Pickens County: C. H. Murphy, Jr. 1 R. E. Eaton, NE SE 34-19s-16w, dry, TD 5,502 ft., no tops reported.

LA.-ARK.

Lafayette County May Have New Oil Pool

SHREVEPORT.—Two wildcats which indicated the possibility of a new pool in Lafayette County were holding attention in Arkansas this week. Ray & Woolf Drilling Co. 1 Kitchens, SE NW SW 17-15s-22w, was spudded for a 3,700-ft. test south of Falcon, and McAlester Fuel Co. 1-A Adams Estate, SW NW 16-16s-24w, flowed 100 bbl. of oil per day from 3,977-92 ft. after perforating the Hill zone. In the new Spirit Lake pool, Magnolia Petroleum Co. is completing its 1 Hyram Moore, C NE SE 14-16s-25w, which flowed 210 bbl. of oil per day from Kilpatrick at 4,115-37 ft.

North Louisiana's deepest hole, Barnsdall-Sohio 1 Carter-Burton, 26-23n-13w, near Bolinger in Bossier Parish, was placed on pump after encountering oil at 3,228-65 ft. in plugging back from below 12,000 ft. In Franklin Parish: Roy Fisher et al 1 Shipp et al, wildcat in 20-16n-8e, southeast of South Big Creek pool, logged Paluxy at 3,554 ft., and was drilling below 3,700 ft.; Atlas Oil & Refining 1 Ayer Timber, 26-14n-9e, was drilling below 4,737 ft. In Winn Parish, H. L. Hunt 1 Goodpine F-133, 25-12n-5w, was drilling at 8,370 ft., and in Concordia Parish, Carter Oil 2 Rhodes, 30-9n-10e, Lake St. John area, was being completed after perforating at 9,072-84 ft., and producing 145 bbl. of 39° oil in a 12-hour test through ¼-in. choke.

ARKANSAS SUCCESSFUL WILDCAT

Ouachita County: McAlester Fuel Co. D-3 C. M. Wesson, SE SE SW NW 24-15s-19w, pumped 107 bbl. of 18° gravity oil per day from Nacatoch at 1,520-4 ft. and 1,531-5 ft., no tops reported, TD 1,535 ft.

ARKANSAS WILDCAT FAILURES

Chicot County: W. O. White et al 1 George Hudson, C NE NW 8-16s-1w, dry, TD 6,125 ft., Cane River 1,286 ft., Tallahatta 1,453 ft., Wilcox 1,761 ft., Midway 2,744 ft., chalk 3,320 ft., Smackover 5,860 ft.

Desha County: Lion Oil Co. 1 Bickham, C NW SW 35-10s-3w, dry, TD 4,881 ft., Midway 3,070 ft., Arkadelphia 3,727 ft., Nacatoch 3,890 ft., Eagle Mills 4,710 ft.

Nevada County: Barnsdall Oil Co. 1 Stuart, W/2 E/2 SW SE 12-14s-23w, dry, TD 5,590 ft., Nacatoch 972 ft., Saratoga 1,295 ft., Annona 1,507 ft., Tokio 1,964 ft., Paluxy 2,124 ft., Upper Glen Rose 2,230 ft., Massive anhydrite 2,550 ft., Basal Massive anhydrite 2,623 ft., James 3,084 ft., Pettit 3,282 ft., Travis Peak 3,385 ft., Buckner 5,285 ft., Smackover 5,478 ft.

NORTH LOUISIANA WILDCAT FAILURES

Caddo Parish: Kerr-McGee 1 H. Johnson, NE SE SE NW 33-19n-14w, dry, TD 6,050 ft., Nacatoch 927 ft., Paluxy 2,488 ft., Massive anhydrite 4,278 ft., Basal Massive anhydrite 4,522 ft., James 5,062

(Continued on page 162)

KANSAS

Southern Pratt County Has New Viola Lime Pool

PRATT County continued to be the most active of Kansas counties from the standpoint of exploratory operations during the past week. In the southern part of the county, about 1 mile north of Sawyer, Bridgeport Oil Co. has erected tanks at the 1 Pride, NE NE NE 24-29-13w, following a gage of 140 bbl. of oil on a 15-hour flow test. Operator set 5-in. casing 1 ft. in the Viola at 4,483 ft., and drilled to a total depth of 4,490 ft., finding 7 ft. of pay. An acid treatment of 1,000 gal. was made prior to testing. The 1 Pride, designated as the discovery well of the Southwest Stoops field, is approximately 1 mile south and slightly west of nearest Viola production in the Stoops field.

Lion Chemical Co., active for some time in development work in Pratt County, has apparently extended the Chance pool ½ mile to the northeast with the 1 Jo, SW SW SW 33-26-13w. At 4,443 ft., 10 ft. in the Arbuckle, the well swabbed 400 bbl. of oil in 32 hours. It is now in process of completion, and a northeast offset, the 2 Jo, NE SW SW 33-26-13, has been staked. Lion has also started another wildcat about 4 miles southwest of the Chance pool. It is the 1 Reschke, SW SW SW 12-27-14w, where operator has set 338 ft. of 8-in. surface pipe and is currently drilling below 2,800 ft.

Rooks County was also assured a new oil pool during the week by the H. H. & B. Drilling Co. et al 1 Hilgers, NE NE NE 13-9-19w, wildcat 1 mile southeast of production in the Barry pool. On last reported tests, the well swabbed at the rate of 14 bbl. of oil per hour with no water showing. Production is from the Arbuckle at a total depth of 3,484 ft. with the top of the pay zone logged at 3,479 ft.

KANSAS SUCCESSFUL WILDCATS

Rush County: Magnolia Petroleum 1 Tammen, SE SE SE 33-19s-16w, flowed 31 bbl. of 40° gravity oil per day from Arbuckle at 3,732 ft., anhydrite 1,057 ft., Lansing-Kansas City 3,423 ft., TD 3,758 ft.

KANSAS WILDCAT FAILURES

McPherson County: J. M. Huber Corp. et al 1 Leffler, SW SW SW 24-19s-1w, dry, TD 2,945 ft., Mississippi lime 2,897 ft.

Reno County: B & R Drilling Co. 1 Drake, SE SE NE 19-22s-9w, dry, TD 3,849 ft., anhydrite 505 ft., Topeka 2,700 ft., Lansing 3,175 ft., Kinderhook 3,486 ft., Viola 3,643 ft., Simpson sand 3,747 ft., Arbuckle 3,819 ft.

Sumner County: Marion Oil 1 Worden, SE SE SW 20-30s-2e, dry, TD 2,686 ft., Kansas City 2,645 ft.

Trego County: Maxda Oil and B&R Drilling 1 Garrett, SE SE NE 16-11s-24w, dry, TD 4,573 ft., anhydrite 2,035 ft., Topeka 3,538 ft., Basal Kansas City 4,034 ft., Heebner 3,767 ft., Lansing 3,788 ft., Mississippi lime 4,339 ft., Fern Glen 4,391 ft., dolomite 4,435 ft., Viola 4,485 ft., Arbuckle 4,543 ft.

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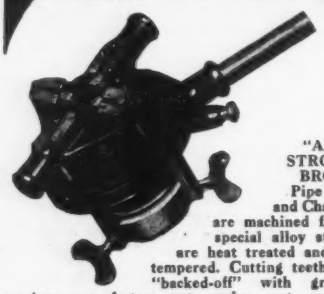

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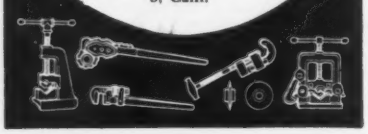


Among the

Drilling Contractors

Warren Bradshaw is drilling contractor on the Standard Oil Co. of Kansas 1 Eskridge, in NE SW SW 18-4n-32, Garvin County, Oklahoma. Pipe was placed at 824 ft. and set with 600 sacks of cement.

Loffland Brothers Co., Los Angeles, has received contracts covering six wells to be drilled for Union Oil Co. of California on the Newlove lease at Orcutt, Santa Barbara County, California Coastal district.

Bishop Drilling Co. has been awarded drilling contract on the Sam A. King 1 Stand, in NW NE NW 23-6n-8e, Hughes County, Oklahoma, and was rigging up for a 2,800-ft. test.

V-T Drilling Co., Evansville, Ind., is drilling contractor on the J. Matt Chi 1 New Harmony Realty Corp., in SW SW 9-5s-14w, Posey County, Indiana.

Moutray & Moore have been awarded drilling contract on the Ellis A. Hall 1 J. B. Terrell, in northwest of Section 80, Block 1, of H&TC Survey, about 10 miles west of Hamlin, in Fisher County, Texas.

J. Simmons Drilling Co. has been awarded contract on the Midstates Oil Co. 2 Wentworth-Washington, in 26-9n-10e, the Lake St. John field, Tensas Parish, Louisiana.

E. L. & M. Drilling Co. is contractor on the Frank B. Murta et al 1 well, in NE SE SW 9-7n-8e, Hughes County, Oklahoma.

Delta Drilling Co., Tyler, Tex., has contract for Tide Water Associated Oil Co. and Seaboard Oil Co. 1 J. L. Lumpkin, Douglas Puckett Survey, Smackover wildcat in the Dalba Springs sector of Bowie County, Tex.

Owen Rives is contractor on the L. A. Ligon 1 Dixon, semiwildcat in NW NE SW 24-8n-7e, Seminole County, Oklahoma, which was drilled to 3,121 ft., 5-in. pipe set at 3,105 ft., and was to drill plug. The 2 Dixon, in NE NE SW 24-8n-7e, was spudded.

Thornbury, Casner & Bentz, Pasadena, will drill the first well for the newly formed Milner Oil Co., Los Angeles. The Milner company has obtained leases on 450 acres in the Bardsdale area, 12-3n-20w, Ventura County, California.

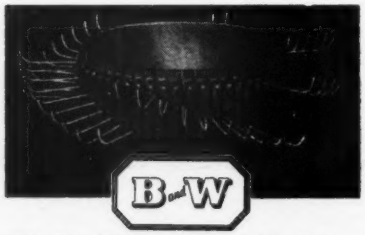
Ray Sanders is drilling contractor on the Morris J. Weinberg 1 Born, Drake & Jackson Comm., in SE NE NE 29-2s-16w, Van Buren County, Michigan.

Gene Reid Drilling Co., Bakersfield, has contracted to drill several wells for Amerada Petroleum Corp. in the Blackwells Corner area, northwestern Kern County, California.

Yarberry & Roberts Drilling Co., Long Beach, has the contract to drill North County Development Co.'s wildcat near the center of 30-27n-5w, in the Red Bluff area, Tehama County, California.

W-L-U Drilling Co., Wichita Falls, has contract on the James N. Crofton 1 Champion, in NE NW NE 31-1s-11w, Cotton County, Oklahoma, which was drilling at 1,700 ft. on a 2,000-acre block. Contract is for 2,500 ft. but operators may drill deeper.

Camay Drilling Co., Los Angeles, has a turn-key contract to drill National Investors Fund, Inc., 1 Burke and Donohoe in 12-4n-1w, Potrero Hills area of Solano County, California.



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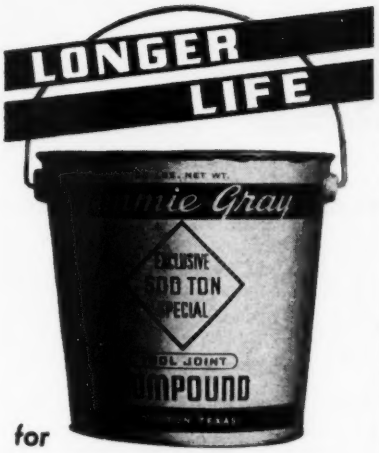

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Glenn Mannes has been awarded drilling contract on the R. T. Jones 1 State-Heath, in SE NE NW 33-3n-14w, Allegan County, Michigan.

Regent Drilling Co., Calgary, has the contract for the first commercial test to be undertaken by Sun Oil Co. in Alberta. This is Sun Oil 1, LSD 11, 8-18-16w4, in the vicinity of Eyremore, Alta.

Olson Drilling Co. is drilling the Amerada Petroleum Corp. 1 Peacock, in NW SW NE 32-33-8w, Harper County, Kansas, which was drilling below 1,350 ft. The test is 10 miles west of Anthony, and 8 miles north of the Oklahoma line.

John H. Saye, Pennville, Ind., will drill the Ralph H. Elliott 1 Fee, in SE SW 4-21-12e, Randolph County, Indiana.

Parker Drilling Co., contractor on the Atlantic Refining Co. 1 Vilhauer, in SW NE NW 22-18n-9w, Kingfisher County, Oklahoma, has a 122-ft. derrick up on the test, which is scheduled to go to 9,300 ft.

CALENDAR

September

National Lubricating Grease Institute, fourteenth annual meeting, Edgewater Beach Hotel, Chicago, September 29-October 2.

October

American Association of Oilwell Drilling Contractors, sixth annual meeting, Plaza Hotel, San Antonio, Tex., October 1-2.

American Institute of Mining and Metallurgical Engineers, Petroleum Division, annual meeting, Galvez Hotel, Galveston Tex., October 3-5.

American Society of Mechanical Engineers, 3-day national conference on petroleum mechanical engineering, Mayo Hotel, October 7-9.

Thirty-fourth National Safety Congress and Exposition, Stevens Hotel, Chicago, October 7-11.

American Gas Association, annual meeting, Atlantic City, October 7-12.

Los Angeles Nomads, Mayfair Hotel, October 9.

California Natural Gasoline Association, twenty-first annual meeting, Ambassador Hotel, Los Angeles, October 11.

Western Petroleum Refiners Association, regional technical meeting, Washington-Youree Hotel, Shreveport, La., October 11.

Houston Nomads, Old College Inn, Houston, October 14.

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 16-18.

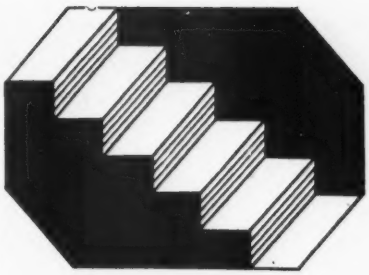
Texas Railroad Commission, state-wide proration hearing, Austin, October 19.

American Institute of Mining and Metallurgical Engineers, Petroleum Division, annual meeting, Ambassador Hotel, Los Angeles, October 24-25.

American Association of Petroleum Geologists, midyear meeting, Buena Vista Hotel, Biloxi, Miss., October 24-25.

Independent Petroleum Association of America, annual meeting, Fort Worth, October 28-30.

Midwest Gas Association and Iowa State College Gas School and Conference, Ames Iowa, October 28-30.



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PERSONALS

OSCAR W. NELSON

United Carbon Head Came to U. S. as Immigrant Boy

OSCAR W. NELSON, president, United Carbon Co., Charleston, W. Va., is a classic example of an immigrant boy making good in the United States.

Born on a farm near Vena, in central Sweden, 67 years ago, Nelson came to the United States at the age of 19 and went to work as a laborer at Kane, Pa. Later he became employed in a carbon-black plant, and by learning every aspect of the business, was sent to West Virginia as a superintendent. There he built several plants. He was advanced rapidly and became general manager of the carbon plants which had been consolidated as the Columbian Carbon Co.

In 1917 Nelson formed a partnership with T. F. Koblegard and T. A. Whelan of Weston, W. Va., to form a carbon-black company. In 1925 he was instrumental in consolidating, under the name of United Carbon Co., 15 companies engaged in the production of natural gas and the manufacture of carbon black. He became president and general manager of the new company, which now operates 16 carbon plants in Texas, Louisiana, Oklahoma, Kansas, Kentucky and West Virginia.

H. K. Groves, assistant general foreman of the refining department of the Baton Rouge, La., refinery of Standard Oil Co. of New Jersey, has been promoted to general foreman, succeeding **Meffre R. Matta,** who has retired. **J. A. Hart** has been promoted to general foreman of the boilermakers department succeeding **Frank G. Clark,** retired, and **G. Ross Murrell** has been named process superintendent succeeding **Leroy V. Robbins,** retired.

W. Dave Henderson, geologist of Midland, Tex., has been elected president of the Midland Geological Society. **Karl A. Mygdal,** of Pure Oil Co., was elected vice president.

James Tanham, vice president in charge of industrial and public relations for The Texas Co., has been appointed by President Truman as an advisor to the American employer representative to the International Labor Organization conference.

Dr. Ward V. Evans, professor of chemistry of Northwestern University, Evanston, Ill., will be awarded the Honor Scroll for meritorious service to the chemical industry by the Chicago Chapter of the Institute of Chemists October 4. The award will be presented at a dinner in Chicago by Dr. C. A. Johnson, of the College of Medicine, University of Illinois.

Max W. Thornburg, former vice president of California Texas Oil Co., Ltd., and Bahrein Petroleum Co., Ltd., and former petroleum adviser to the U. S. State Department, returned to the United States recently from Iran and is planning a trip to Latin America. Thornburg is now an independent petroleum consultant.

A. M. Moore, safety engineer of Shell Oil Co., Inc., at Midland, Tex., has been promoted to production foreman at McCamey, Tex., and **S. M. Sisley,** assistant manager of gas-gasoline operations at Tulsa, has been named assistant general superintendent of gas-gasoline at Houston. Recent Shell transfers in the Gulf Coast area include: **J. B. Davis, Jr.,** junior mechanical engineer, Kilgore, Tex., to Midland; **T. P. Dowdy,** drilling foreman, Sheridan, Tex., to Quitman, Tex.; **G. H. Embry,** drilling foreman, La Pice, Tex., to Sheridan; **H. C. Lay,** district superintendent, Houma, La., to the South Texas Division; **F. D. Leigh,** mechanical engineer, Kilgore to Midland; and **R. M. Carroll,** junior exploitation engineer, Houston to Cleveland.

Eugene W. Vanderpool, Stanolind Oil & Gas Co. geologist in Midland, Tex., has resigned after 7 years' service to establish a residue-research laboratory.

Carl H. McAlister, formerly chief geophysicist for Union Sulphur Co., has been named chief geophysicist for Sunray Oil Corp. McAlister, a graduate of the University of Oklahoma, was connected with Petty Geophysical Co. and Sinclair-Prairie Oil Co. before joining Union Sulphur.

R. C. Earlougher, of Earlougher Engineering Co., has been elected chairman of the board of the Mid-Continent section of the American Institute of Mining and Metallurgical Engineers. Other new officers include: **W. A. Bruce,** Carter Oil Co., first vice chairman; **P. P. Manion, Jr.,** Stanolind Oil & Gas Co., second vice chairman; **John P. Hammond,** Amerada Petroleum Corp., secretary-treasurer. **W. B. Berwald,** who was initially elected chairman, resigned because of his transfer to the main office of Ohio Oil Co. at Findlay, Ohio.

GEORGE R. REED

George Russell Reed, maintenance mechanic at the Iowa, La., plant of Shell Oil Co., Inc., has been awarded the Josseph A. Holmes safety award for heroism. Reed is credited with saving the life of a fellow employe, **Raymond L. Garrett,** by breaking his fall from the top of a 36-ft. still. Reed previously was awarded the Carnegie Bronze Medal.

S. R. Cohagan, vice president in charge of the Texas Division of Argo Oil Corp., and formerly stationed in Fort Worth, will head the company's new offices in San Antonio. **R. I. Simon,** production superintendent, also will be stationed in San Antonio.

Stanley L. Westlake has been promoted to superintendent of maintenance of Magnolia Pipe Line Co. He works under the direction of J. G. Norton, chief mechanical engineer, who supervises the mechanical and maintenance departments.

Frank C. Smith, president of the Houston Natural Gas Corp., has been named chairman of the Committee for Economic Development for Texas.

Lindor C. Carnino, petroleum production engineer of Standard Oil Co. of Argentina, left last week for Argentina after completing a 2-year training period with Carter Oil Co.

B. W. Beebe, geologist for Bay Petroleum Corp. in Wichita, Kans., has been transferred to Denver as chief geologist to head the exploration department of the company.

W. H. Beekhuis, of Standard Oil Co. of California, has been named to the position of economic counsel, and **F. M. Jayne** has been appointed manager of the analytical division in the comptroller's department. Other Standard of California promotions include: **M. T. Miller,** assistant production foreman of the northern district, to senior oil and gas coordinator at Los Angeles; **C. R. Dodson,** petroleum engineer, to lead production engineer; and **A. D. Henderson,** production foreman, to assistant production superintendent. Recent Standard of California transfers include: **J. T. Crooker,** assistant production foreman at Buena Vista Hills, to the northern district; **M. E. Kinnebrew,** production foreman at East Coalinga, Calif., to Kettleman Hills, Calif.; **J. J. Higginbotham,** production foreman at Kern River, Calif., to East Coalinga; and **C. S. Toy,** assistant production foreman at Kern River, to Kettleman Hills.

A. I. Levorsen, member of the faculty of Stanford University and former president of the American Association of Petroleum Geologists, has been nominated for president of the Geological Society of America.

John P. McKenna, former Army major in the finance department and the signal corps, has been promoted to assistant treasurer of The Texas Co. and will have his headquarters in the company's Houston building. He will assume his duties in Houston about November 15. McKenna joined The Texas Co. in 1923, in the office of the New York terminal division of the refining department. He later filled various positions in the treasury department and advanced to assistant to the treasurer in January 1940.

C. F. Smalley of Mudge Oil Co., has been appointed superintendent in charge of the company's new office at Duncan, Okla. **O. F. Leichliter, Jr.,** will be his assistant.

W. MONTGOMERY

Charles P. Baker, who was transferred last January from Magnolia Petroleum Co. to the East St. Louis refinery operated by Lubrite Division of Socony - Vacuum Oil Co., Inc., is being advanced from general plant superintendent to plant manager, effective October 1. Baker had been employed as technical adviser to the operating department at the Beaumont, Tex., refinery of Magnolia Petroleum Co. prior to January 1. He was transferred to East St. Louis as assistant to **W. H. Montgomery,** plant manager, and on March 1, he was promoted to general plant superintendent. During the war, he advanced from second lieutenant to major, assigned to the Petroleum Administration for War as chief of the aviation section. Montgomery, former plant manager, who will become industrial relations manager of Socony-Vacuum in New York, succeeds **W. H. Zabriskie,** who has been appointed secretary of Socony-Vacuum's manufacturing committee. From 1928 to 1941 Montgomery was at the Palembang refinery of the Standard-Vacuum Oil Co. in the Dutch East Indies and was assistant general superintendent when he left there just before the war. Following his return to the United States he became associated with Socony-Vacuum at its Lubrite Division and became refinery manager there in 1943.

John C. Gregory has been named assistant treasurer of Atlantic Refining Co. He is a graduate of the University of Pennsylvania and has been with the company since 1929.

A. A. Curtice, of the geological and geophysical firm, Hoover, Curtice & Ruby, is back in New York after spending a vacation in California and will leave shortly for Latin America. Curtice recently completed the proposed draft for revising Peru's petroleum laws. **Glen Ruby,** of the same firm, is back in Chile after visiting the United States and Alaska.

Winthrop Rockefeller, recently discharged from the Army as a lieutenant colonel after more than 4 years' service, has joined the staff of the producing department of Socony-Vacuum Oil Co., Inc. Prior to his Army service, Rockefeller was associated with the industrial relations department of Standard Oil Co. of New Jersey, the producing department of Humble Oil & Refining Co., and also the foreign-trade department of Socony-Vacuum.

SHIFTS—

Thomas L. B. Wood, engineer, Southern California Gas Co., Lynwood, to Compton, Calif.; **Charles A. Graham,** president, Santa Clara Petroleum Co., Inc., Palm Springs, to Montebello, Calif.; **E. Randolph Smith,** engineer, Seaboard Oil Co. of Delaware, Glendale, to Van Nuys, Calif.; **Vernon T. McGhee,** engineer, Phillips Petroleum Co., Smackover, Ark., to New London, Tex.; **Joe T. Magee,** engineer, Shell Oil Co., Inc., Eagle Lake, to Pleasantville, Tex.; **Ralph J. Schilthus,** engineer, Humble Oil & Refining Co., Houston to Corpus Christi, Tex.; **John P. Strong,** engineer, Atlantic Refining Co., Odessa, Tex., to Dallas; **Richard W. Coburn,** engineer, Atlantic Refining Co., Franklin, La., to Dallas; **Marcus A. Loy,** engineer, Atlantic Refining Co., Greggton, Tex., to Dallas; **E. M. Funkhouser,** geologist, Woodley Petroleum Co., Abilene, to Midland, Tex.; **Jesse A. Rogers,** geologist, The Texas Co., Midland, to Pampa, Tex.; **William F. Shelton,** engineer, Humble Oil & Refining Co., Houston to Franklin, La.; **J. Paul Ratliff,** engineer, Humble Oil & Refining Co., Coushatta to New Iberia, La.; **Frank Keller,** engineer, Union Sulphur Co., Lake Charles to Sulphur, La.; **D. E. Sullenberger,** engineer, Arkansas Fuel Oil Co., Shreveport to Magnolia, La.; **William A. Cain,** engineer, Phillips Petroleum Co., Phillips, Tex., to Smackover, Ark.; **Louis A. Kassel,** chemist, Universal Oil Products Co., Chicago, to Riverdale, Calif.; **James W. Trow,** geologist, Gulf Oil Corp., Chicago to Norway, Mich.; **Paul S. Lewis,** engineer, Humble Oil & Refining Co., Hattiesburg to Columbia, Miss.; **C. O. Wells,** foreman, Continental Oil Co., Yazoo City to Forest, Miss.; **O. W. McGinty,** engineer, Great Lakes Pipe Line Co., Cushing, Okla., to Cameron, Mo.; **R. B. Davidson,** foreman, Sun Oil Co., Troy, N. Y., to Camden, Me.; **Dan F. Kralis,** geologist, General Petroleum Corp., Denver to Lamar, Colo.; **E. E. Clark,** engineer, Phillips Petroleum Co., Oklahoma City to Eureka, Kans.; **Walter C. Jenneman,** engineer, The Texas Co., Wichita to Lyons, Kans; **Richard T. Major,** engineer, Cooperative Refinery Association, Kansas City, Mo., to Coffeyville, Kans.; **Robert L. Hoss,** engineer, Phillips Petroleum Co., Austin, Tex., to Tulsa; **S. M. Sisley,** engineer, Shell Oil Co., Inc., Houston to Tulsa.

Dr. W. P. Jenny, consulting geologist and geophysicist, is back in Houston after spending several months in Europe.

R. G. Follis, president of Standard Oil Co. of California, left by plane September 20 for Venezuela to inspect oil operations at the company's concessions. He was accompanied by **R. C. Stoner,** vice president and director in charge of production.

Equipment Men in the News

Leonard Named Manager Of Oakite Division

Announcement is made by Oakite Products, Inc., New York, of the appointment of J. C. Leonard as sales manager of its industrial marketing division. Associated with the Oakite organization for over 22 years, the last 16 years in the capacity of manager of the company's Chicago division, Leonard assumed his new duties on September 1.

Byron Jackson Purchases Butte Pump & Motor Works

Byron Jackson Co. announces acquisition of Butte Pump & Motor Works in Chico, Calif. The acquired business was established in 1925 as Gas & Electric Service Co. The name was changed in 1934 and the business at the present time consists, in addition to acting as a dealer of Byron Jackson Co. pumps, in the rewinding of motors, electrical wiring, servicing of neon signs, sale of appliances such as refrigerators, washing machines, radios, etc. A modern two-story concrete building has recently been completed to house the business at Ninth and Broadway in Chico. A. F. Vonnegut, who has been with Byron Jackson for 16 years, will assume charge as manager, with no other changes in personnel.

Steele Appointed Oil Base Coastal Territory Representative

E. N. Steele has been appointed coastal-territory representative for Oil Base, Inc. Prior to joining Oil Base, he was head drilling engineer for Bell & Loffland, drilling contractors, California division superintendent for Baroid Sales Division, and manager of Antelope Materials Co. division, Macco Construction Co.

Cline to Represent Hinderliter In Southwest Texas

Myrl V. Cline has been appointed Southwest Texas representative for Hinderliter Tool Co., Tulsa, manufacturers of well-head equipment and rotary tool joints. Cline's headquarters are in Alice, Tex.

Kennedy New Sales Promotion Manager

Appointment of Edmund D. Kennedy as sales promotion manager of Monsanto Chemical Co.'s plastics division is announced by F. A. Abbiati, general sales manager.

Baker Transfers McIntire To New York Office

Russell V. McIntire has been transferred to the New York office of Baker Oil Tools, Inc., at Room 1914, 19 Rector Street, where he will assist in export sales of Baker products.

Previous to his association with Baker for the past 4 years in sales and service work at Taft and Sacramento, Calif., McIntire was for 13 years in the field department of Belridge Oil Co. in California.

Gillis Returns to Monsanto

John L. Gillis, vice president of Johnson & Johnson International, New Brunswick, N. J., will join Monsanto Chemical Co. on October 1, it is announced by William M. Rand, Monsanto president. Gillis was formerly connected with the Monsanto foreign department as general export manager and assistant director of the department, having left in June 1944 to go with Johnson & Johnson.

Morris to Manage New Store

Carl Morris, of Casper, has been placed in charge of National Supply Co.'s new store being constructed at Rock Springs, Wyo. Formerly he was manager of the Casper store.

S. I. & F. Announces Two Appointments

The Steel Improvement & Forge Co., Cleveland, announces through its president, C. H. Smith, Jr., the establishment of a turbine forgings division which will consist of a specialist in every phase of the production of forgings of high temperature alloys and quality control. Carl I. Schweizer, chief metallurgist, is in charge of this division.

C. I. SCHWEIZER

A. ZIMMERMAN

Also announced by the company is appointment of Arthur Zimmerman as sales manager. Zimmerman was formerly associated with The Weatherhead Co., Cleveland, as assistant chief engineer, and lately had been active in sales and engineering work in connection with gas-turbine accessories.

Pennsalt Manufacturing Manager Sails for Europe

Walker Penfield, manager of manufacturing of Pennsylvania Salt Manufacturing Co., has sailed for Europe for a 2-month visit of chemical companies in England, France, and Denmark. He will be joined later at Cryolite Co. in Copenhagen by Cyril Hayward, chief chemist of the Pennsalt plant at Natrona, Pa.

E. A. Tice Joins International Nickel

E. A. Tice has joined the corrosion engineering section of the development and research division of The International Nickel Co., Inc., at New York, as a corrosion engineer. He was previously associated with Bethlehem Steel Co. in the research department as an engineer in the field of corrosion.

Schraub Elected to Board of Directors

L. G. Schraub, vice president and general manager, has been elected to the board of directors of Union Wire Rope Corp., Kansas City, Mo.

Kishbaugh Named to Staff of New Ryerson Steel Plant

T. L. Kishbaugh has become associated with the new Los Angeles plant of Joseph T. Ryerson & Son, Inc., warehouse steel distributors. Kishbaugh has been identified with the warehouse steel business since 1930 when he joined the Earle M. Jorgensen Co. of Los Angeles where he served successively as salesman, manager of sales, vice president and general sales manager and, for 2 years prior to his resignation early in 1946, vice president and merchandising manager. At one time he was connected with the Bethlehem Steel Co.

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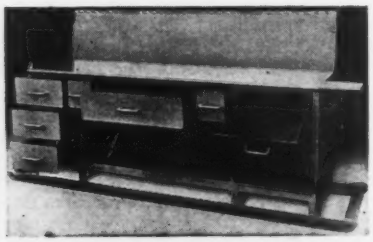

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